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TROPICAL DISEASES
BULLETIN.

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1918.

[No. 1.

AMOEBIASIS AND DYSENTERY.

AMOEBIASIS.

ROUBAUD (E.). *Le Rôle des Mouches dans la dispersion des amibes dysentériques et autres protozoaires intestinaux.*—*Bull. Soc. Path. Exot.* 1918. Mar. Vol. 11. No. 3. pp. 166–171.

Roubaud refers to the conflicting opinions of KUENEN and SWELLENGREBEL on the one hand [this *Bulletin*, Vol. 3. p. 76], who consider that cysts ingested by flies are destroyed in the intestine and of D. and J. THOMSON, and WENYON and O'CONNOR and also CHATTON on the other, who find that the cysts pass through the fly's intestine unaltered.

The author made experiments with the housefly in the absence of *Calliphora*, *Lucilia*, *Sarcophaga*, etc., and tested the vitality by the eosin test of KUENEN and SWELLENGREBEL. He found that the cysts of *E. histolytica*, *E. coli* and *Lamblia intestinalis* were unaltered by passage through the fly. This fact, which at first sight would appear to render flies a danger is discussed by the author, and he concludes from experiments on the effect of drying cysts and of exposing cysts to moist surroundings that the majority of cysts deposited by flies do not survive any length of time. In most cases the author considers that fly excrement is deposited on dry surfaces and so the cysts are rapidly destroyed. Flies may be viewed rather in the light of purifying agents because they distribute in innumerable easily sterilized droplets faecal matter which in the mass might be a source of danger. Flies containing cysts when drowned in water were found to contain cysts still apparently alive at the end of a week at least, but at this period the fly tissues were still in such a state of preservation as to prevent the water being contaminated by liberation of the cysts. At the end of a month, by which time drowned flies could be broken up by simple agitation of the water, no living cysts were found in them.

In conclusion the author states that flies can act as vectors of the human intestine protozoa only in rather limited conditions, namely when the fly deposits the cysts in a liquid or on moist food. Multitudes of flies ingesting and distributing infective human faeces act therefore as destroyers of cysts. [The "limited conditions" of Roubaud appear to be precisely the conditions of danger with which J. and D. THOMSON (this *Bulletin*, Vol. 8. p. 115) and WENYON and O'CONNOR (*loc. cit.*, Vol. 10. p. 126) are concerned].

B. Blacklock.

JAMES (William M.). **Chronic Intestinal Amebiasis.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1916. July-Dec. Vol. 9. Pt. 2. pp. 69-74.

In speaking of amoebic dysentery as apart from chronic intestinal amoebiasis, James states, "This form of disease is very well known to the physicians in the Canal Zone and Panama, it is easy to diagnose, and when properly treated, is soon cured." He proceeds then to deal with chronic intestinal amoebiasis, with special reference to those cases in which no history of an acute attack can be obtained; the long standing of some of these cases is mentioned. The value of proctoscopic examination is emphasized. The treatment of the chronic cases is the same as that of acute amoebic dysentery and the author warns against relying solely on emetine. A statement on the subject of treatment seems worthy of quotation as an indication of the author's attitude.

"Intestinal amebiasis, whether acute or chronic, can be eradicated, provided the patient is not *in extremis* with the acute form, with the same certainty as malaria and with more certainty than syphilis, by the use of a liquid diet until the stools are formed, and of bismuth given in doses of not less than a teaspoonful four times a day, continuing over a period of several weeks, and emetin to the point of physiological reaction."

The author refers to the case of Dr. ELMASSIAN and to the work he did on intestinal amoebae.

B. B.

FISCHER (Walther). **Amoebae and Dysentery.**—*China Med. Jl.* 1918. Jan. Vol. 32. No. 1. pp. 13-20.

The author accepts provisionally the separation of intestinal amoebae of human beings into two groups, pathogenic and non-pathogenic; for the former he prefers the name *E. dysenteriae*. He finds that it is sometimes impossible to distinguish morphologically the pathogenic from the non-pathogenic forms. He found that cysts of the pathogenic amoeba were present in 10 per cent. of 150 healthy strong people between 20 and 40 years of age who had lived for two or three years in Shanghai.

In a dog which had dysenteric symptoms the author found amoebae on examination after death; ulcers of the colon were found.

Reference is made to a previous paper of the author [see this *Bulletin*, Vol. 3, p. 457] in which he gave an account of a case of cystitis in which amoebae were present.

B. B.

NELSON (W. H.) & SHEARMAN (C. H.). **A Case of Amoebic Dysentery Apparently Contracted in Australia.**—*Med. Jl. Australia.* 1918. Jan. 19. Vol. 1. 5th Year. No. 3. pp. 44-46.

A butcher aged 35 years, who was born in Lancashire and served in the South African war during which he had occasional attacks of diarrhoea, developed symptoms of dysentery in 1917, in Perth, Australia. This was his first attack of intestinal trouble in Australia. Amoebae were found in the stools and at a later period *E. histolytica* cysts. The authors think the infection was acquired in Australia. They refer also to a case of liver abscess in a man

who had never left Australia. The pus culture was negative but amoebae were not found, owing, they consider, to the age of the sample.

B. B.

NOBÉCOURT & GIMBERT (H.). *Note sur quelques cas de dysenterie amibienne autochtone observés dans une armée.*—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1918. Jan. 24. 3 Ser. Vol. 34. No. 1-2. pp. 57-60.

In one French army during the period from Sept. 21 to Dec. 31, 1917, twenty-two cases of amoebic dysentery occurred. The origin of the disease could not be traced in five of the cases, in eight cases the dysenteric attack was a relapse in men who had originally contracted the disease in the colonies or in the Eastern army, while in nine cases the dysentery was acquired in France. The relapse cases occurred in October (6 cases) and December (2 cases), while the cases acquired in France occurred in October (4 cases), November (4 cases) and December (1 case). The authors are of opinion that the source of infection was the carriers from tropical regions. Reference is made also to seven cases occurring among prisoners of war. A statement of the method of treatment adopted is given.

B. B.

DOBELL (Clifford) & STEVENSON (A. C.). *A Note on the Duration of Infections with Entamoeba histolytica.*—*Trans. Soc. Trop. Med. & Hyg.* 1918. Feb. Vol. 11. No. 4. pp. 168-175.

The authors give an account of three cases in which prolonged infection with *E. histolytica* appears to have been present. They conclude from them that infection may persist certainly for 16 and probably for as long as 34 years. Of the case of one patient who had his original attack of dysentery 34 years ago in Egypt the authors say: "Case 1 had acute dysentery in Egypt 34 years before we examined him. Shortly after the original attack he suffered from a relapse. Since then he has resided in England, where the chances of acquiring infection with *E. histolytica* are very small." The authors criticize the attitude of MATHIS and MERCIER [this *Bulletin*,* Vol. 10, p. 131], who consider that amoebic dysentery outbreaks in France due to spread of infection from overseas troops are not likely to occur owing to the dying out of the infection in cold and temperate climates. They say—

"It will, of course, be necessary for them [i.e., MATHIS and MERCIER] to furnish proofs that the cases really were at one time infected with *E. histolytica*; that they have undergone no specific treatment; and that their infections have now completely disappeared. At present we ourselves know of no such cases; and from our own experience we think that convincing evidence of their existence will not be easily obtained."

[Might not the first part of this criticism be applied to the paper under review? It is by no means established that the chances of acquiring infection with *E. histolytica* in England are very small (this *Bulletin*, Vol. 10, p. 123).]

B. B.

* This opinion is not mentioned in the summary

DOBELL (Clifford) & JEFFS (Margaret W.). **A Study of the Diverse Races of *Entamoeba histolytica* Distinguishable from one another by the Dimensions of their Cysts.** (A Report to the Medical Research Committee.).—*Parasitology*. 1918. Apr. Vol. 10. No. 3. pp. 320–351. With 1 plate & 7 figs.

The first part of this paper is devoted to a detailed account of the methods used to determine the dimensions of the cysts of *E. histolytica* not only in the living condition but during each process of fixing, staining and mounting. For the purpose of studying cysts during fixing and staining, the authors used the following method. A small drop of faeces containing the cysts was mixed on a slide with a 5 per cent. solution of gelatine (in physiological saline), liquified by warming. A small drop of this emulsion was spread on a coverglass ($\frac{1}{8}$ " \times $\frac{7}{8}$ ") and the latter placed inverted in the concavity of a hollow ground glass block (6 cm. \times 6 cm., 1.25 cm. thick, with a deep concavity 5 cm. in diameter), the corners of the coverglass being cemented to the block with drops of paraffin wax. The preparation was examined under a low power of the microscope and when a cyst had been found it was centred and measured using the oil immersion lens and ocular micrometer. When the gelatin had set, but before it had dried, fixative was introduced with a pipette to fill the space under the coverglass. The processes of staining, dehydration, clearing and mounting in balsam were carried out by pipetting. The measurements of the cysts could be made at each stage. The changes in dimension found are shewn in tables.

The second part of the paper deals with the demonstration of the existence of races of *E. histolytica* which differ from one another in the size of the cysts which they produce. It is illustrated by curves and furnished with tables. The authors compare their results with those of other workers. The summary and chief conclusions are:—

"1. *Entamoeba histolytica* Schaudinn (vel *E. dysenteriae* Councilman and Lafleur), the human dysentery amoeba, is a collective species. It comprises a number of distinct races, strains, or pure lines, distinguishable from one another by the size of the cysts which they produce.

"2. How many such distinct races exist is still undetermined: but we have demonstrated the existence of at least five.

"3. There is no evidence that the different races differ in their geographical distribution, or in any character save size.

"4. These races remain constant in character within a given host; and the dimensions of the cysts are not determined by the action of the host upon the parasite, since two different races may coexist side by side in the same host.

"5. Different values for the dimensions of the cysts are obtained when these are measured in different media. Taking the measurements of living cysts suspended in physiological saline solution as representing the true value, we find that the dimensions of cysts in iodine solution are approximately the same; but that cysts which have been suitably fixed, stained, and mounted in balsam, have undergone an apparent reduction of approximately 10 per cent. from the true diameter.

"6. The most suitable fixative for *E. histolytica* cysts we have found to be a modification of Schaudinn's fluid. (Saturated aqueous solution of corrosive sublimate, two parts; absolute alcohol, one part; glacial acetic acid, 4–5 per cent.). Cysts fixed in this fluid undergo no measurable shrinkage or swelling in the process.

"7. The apparent loss of size observed in cysts which have been fixed, stained, and mounted in balsam, is due chiefly to the invisibility of the cyst wall in the mounting medium.

"8. It follows from what has been said above (5 and 6) that to obtain an approximately true value for the dimensions of the living cysts from measurements made upon those suitably fixed, stained, and mounted in balsam, these measurements should be multiplied by the factor $\frac{1}{2}$.

"9. We find no evidence of the existence of a sexual dimorphism in the cysts belonging to a single race, such as has been described by Mathis and Mercier.

"10. Since cysts of *E. histolytica* may be found with all diameters* from about 5μ to about 20μ —a range overlapping or covering the dimensions of the cysts of the two common harmless intestinal amoebae of man (*E. coli* and *E. nana*) and of other cysts and cyst-like bodies occurring in human faeces—it is of considerable practical importance to recognize and distinguish the diverse races of *E. histolytica* which differ from one another in the dimensions of the cysts which they produce."

B. B.

DORELL (Clifford), (GETTINGS (H. S.), JEPPE (Margaret W.) & STEPHENS (J. B.). **A Study of 1,300 Convalescent Cases of Dysentery from Home Hospitals: with Special Reference to the Incidence and Treatment of Amoebic Dysentery Carriers.**—*Medical Research Committee, National Health Insurance.* Special Report Series No. 15, 28 pp. 1918. London: H.M. Stationery Office. [Price 6d. net].

This report is divided into three parts. The first contains the bacteriological findings, the second the incidence of protozoal infection and the third an account of treatment of cases infected with *E. histolytica*. The period during which stool examinations were made was from December 1916 to the early summer of 1917. Of the 1,300 cases—all previously discharged as negative from home hospitals—156 were found to be infected with *E. histolytica*. In this number are included cases infected with strains of *E. histolytica* producing small cysts. The localities from which the cases traced had been returned are shewn in the following table.

Table 3.

Dysentery contracted in	No. of cases examined.	No. of cases infected with <i>E. histolytica</i> .	Per cent. of cases infected.
France	788	66	8.37
Salonika	333	63	18.92
Egypt	58	11	18.96
Gallipoli	13	3	23.07
Mesopotamia* ..	39	8	20.51
Mediterranean† ..	5	2	40.00
India	3	2	66.66
China	1	1	100.00
Total	1,240	• 156	—

* Including cases from the Persian Gulf.

† Excluding cases from Salonika, Egypt and Gallipoli. One of the two infected cases from this area came from Serbia, the other from Malta.

The summary and conclusions of part two are:—

"1,300 patients were examined, and 156 (12 per cent.) found infected with *Entamoeba histolytica*.

"The incidence of infection was lower in the cases invalided from the French front (8·37 per cent.) than among those from the East and Near East (19 per cent. and upwards).

"There is evidence that the majority of carriers from the French front had acquired their infections with *E. histolytica* in France or England." *

Part 3 of the report deals exhaustively with the methods of treatment adopted and the results obtained.

The summary and conclusions are:—

"One hundred and fifty-five amoebic dysentery carriers were treated with emetine bismuth iodide, administered in various forms, and in doses of 3 grains daily for 12 or more days consecutively. One hundred and forty-two cases (91·6 per cent.) were finally discharged as cured. Analysis of our findings indicates that the most successful results were obtained by administration of the drug as an uncompress powder in gelatine capsules. A single first course of treatment (3 grains daily for 12 consecutive days = 36 grains) cured 90 per cent. of the cases so treated.

"When cases remain uncured after such treatment the best method of re-treating them is to give them a double course of the drug (3 grains daily for 24 consecutive days = 72 grains).

"Such treatment has not cured every case; but there is no evidence that those which are not curable by this means constitute more than 5 per cent. of all carriers of *E. histolytica*."

B. B.

WATSON-WEMYSS (H. L.) & BENTHAM (T.). **Protozoological Affections of the Intestine: the Treatment of the Amoebic Carrier.**—*Lancet*. 1918. Mar. 16. pp. 403-404.

In the period June to September 1917 the authors made 1,766 examinations of faeces in 731 cases in the Mediterranean and discovered 82 cases of *E. histolytica* cyst infection. The authors treated their cases with emetine bismuth iodide in salol-coated pills and at the same time hypodermic injections of emetine. Thirty cases are reported on in this paper. The treatment consisted of 3 grs. daily of emetine bismuth iodide for 12 days plus 1 gr. emetine for the first five days. The observation period was a minimum of four weeks with six examinations, except in a few cases. The results were that only 3 cases failed to be cured after one course of the combined treatment, and of these one was apparently cured after a second course, while the remaining two continued to pass amoebae and cysts. Some notes of flagellate dysentery conclude the paper.

B. B.

Low (George C.). **A Series of Acute and Subacute Amoebic Dysentery Cases treated by Emetine Bismuth Iodide and other Drugs.**—*Trans. Soc. Trop. Med. & Hyg.* 1918. Feb. Vol. 11. No. 4. pp. 155-167.

The author includes in his acute cases acute first attack and "acute exacerbations" of a previous attack. Three cases, of which one

* Mr. DOBELL has pointed out that in the summary of his paper on p. 178 of Vol. 9 of this *Bulletin* under "*Percentage of Cases Infected with E. histolytica*" at Walton Hospital the figure for Non-intestinal cases should be 15·7 and not 1·57. This is an unfortunate error because the record for this class, in reality higher than that for Dysenteric and Intestinal cases, is made to appear much lower.—[E.D.]

belonged to the former group and two to the latter, are described in detail with charts. The acute first attack case was cured by emetine bismuth iodide (observation period 21 days negative after treatment) and likewise one of the "acute exacerbation" cases (53 negative examinations after treatment); the other relapsed.

Two subacute cases are described. One relapsed after a first course of emetine bismuth iodide, but recovered after a second course of 18 daily doses grs. 3 combined with 12 daily doses of gr. 1 of emetine hypodermically (observation period Aug. 6 to Dec. 18, 35 negative examinations). Heart irregularity developed, and the patient was weak after treatment, but these symptoms cleared up. The second case proved intractable. Courses of emetine bismuth iodide 72 grs. in all, chaparro amargosa and iso-emetine failed to cure the condition.

B. B.

BROC (René) & CHATTON (Edouard). Observations relatives à l'action thérapeutique de l'iodure double d'émétine et de bismuth (Méthode Du Mez—Dale—Leboeuf) dans la dysenterie amibienne aiguë et chronique.—Arch. Inst. Pasteur de Tunis. 1918. Mar. Vol. 10. No. 3. pp. 170 177.

The authors give an account of six cases of amoebic dysentery in which the treatment by this drug in keratin coated capsules appeared to be successful in eradicating the disease.

B. B.

SHEPHEARD (S.) & LILLIE (D. G.). Persistent Carriers of *Entamoeba histolytica*. Treatment with Chaparro Amargosa and Simaruba.—Lancet. 1918. Apr. 6. pp. 501-502.

The authors give an account of the results obtained in treating with the drugs mentioned 81 *E. histolytica* carriers, who had with one exception previously received at least two courses of emetine bismuth iodide without clearing the infection. In the case of chaparro amargosa (*Castela nicholsoni*) the following portions of the plant were dried, powdered and used for making decoctions: (1) twigs and leaves, (2) root bark, (3) decorticated root. Five heaped teaspoonfuls daily was the dose administered, decoctions from three of them being given by the mouth and from two by the rectum. A teaspoonful was boiled for 15 to 30 minutes in 20 oz. of water, the decoction being then cooled and strained and administered as a drink half an hour before meals, or as a rectal injection in the knee and elbow position. The course lasted 7 to 10 days. A bitter principle obtained was also tested. In the case of Simaruba bark [see also this *Bulletin*, Vol. 5, p. 203] the bark was cut into $\frac{1}{4}$ inch lengths and treated as above, the dose being the decoction from a half to two handfuls of the bark. The following table presents the results obtained. The observation period after treatment was not less than 5 weeks with 6 examinations.

Preparation	Cases treated (81)	Cases "cured" (34)
Chaparro, twigs and leaves ..	7	4
„ root-bark	30	11
„ root	33	16
„ bitter principle ..	4	0
Simaruba	7	3

The authors refer to the work of NIXON on chaparro amargosa [*loc cit.*, Vol. 6, p. 51, and Vol. 8, p. 114; see also Vol. 4, p. 303].

B. B.

CALAME (Paul). **De la dysenterie amibienne et traitement d'un cas par les lavements de néosalvarsan.**—*Rev. Méd. Suisse Romande*. 1918. Feb. Vol. 38. No. 2. pp. 125-137. With 1 chart & 3 figs.

After some general observations on pathology, symptomatology and diagnosis of amoebic dysentery the author gives an account of the historical aspects of the nomenclature of the parasite. He then gives an extended account of a case which he treated by rectal injection of silver nitrate solution and other drugs with definite but temporary benefit. Subsequently he was considering the advisability of appendicostomy but before proceeding to this last resort he tried the effect of rectal injections of neosalvarsan. The immediate result was remarkably good, symptoms ceasing, the stools becoming formed and normal, and the patient gaining weight. The injections were nine in number and were increased from gm. .45 in 200 cc. to gm. .9 in 1,000 cc. The author considers the method worth trial and quotes previous workers' results.

B. B.

BAYMA (Theodoro). **Novas medicações da Dysenteria Amebica.** [New Treatment for Amoebic Dysentery.]—*Ann. Paulist. Med. e Cirurg.* 1917. Aug. Vol. 8. Year 5. No. 8. pp. 173-183.

The author published three papers in the above journal [July 1915, August and November 1916 (see this *Bulletin*, Vol. 7, p. 201)] in which he described the treatment of amoebic dysentery with adrenalin. He now summarizes the progress which this treatment has made in popular favour since its introduction, a number of recent publications bearing on the subject being passed in review. His conclusion is that the treatment with adrenalin is preferable to any other in certainty and freedom from unpleasant symptoms, such as are experienced with the double iodide of emetine and bismuth, when given by the mouth.

J. B. Nias.

SIGNORELLI (E.) & BUSCAINO (V. M.). **Bradycardia e riflesso oculocardiaco nella dissenteria amebica.**—*Riv. Patologia Nervosa e Mentale*. 1917. Nov. 17. Vol. 22. No. 11. pp. 487-490.

One of the clinical symptoms in patients suffering from amoebic dysentery which the authors observed was bradycardia, which they found constantly in the second period of the illness after the dysenteric

crisis was past. This symptom was observed in the cases which recovered spontaneously as well as in those treated. Systematic examination of the cardio-vascular mechanism during life, and in six cases the post mortem examination, gave no evidence of organic lesion, to account for this condition. The authors therefore made experiments by injecting subcutaneously atropine and adrenalin and noted that the pulse rate rose finally to normal or above. They conclude that the condition of bradycardia is a functional one and that it is due to vagotony and not to inactivity of the sympathetic, which is on the contrary excitable. Testing the oculo-cardiac reflex after the method of PETZETAKIS they found it normal in about 17 per cent. of 150 cases while in about 81 per cent. it was weak, abolished or inverted. By further experiments during the primary phase of the action of atropine they established the absence of any interruption in the trigemino-vagal arc during the period of bradycardia and the presence of some degree of sympathetic hypertony. They explain the genesis of the condition of bradycardia on the assumption that the plexus of Meissner is stimulated excessively during the process of healing of the submucous abscesses caused by the amoebae [compare this *Bulletin*, Vol. 11, p. 247].

B. B.

AGATI (Valfredo). *Statistica e topografia dell'ascesso epatico in Provincia di Milano.*—*Giorn. d. Reale Soc. Ital. d'Igiene.* 1917. Oct. 31. Vol. 39. No. 10. pp. 145–153. With 1 map.

The author endeavoured to discover the prevalence of liver abscess in the province of Milan from official sources, but the information obtainable was insufficient. He adopted the method of direct communication with medical men and drew up a form which was sent to 230 in various districts; 180 replies were obtained. The present paper is devoted to analysis of those replies which contained adequate information. The cases occurring during the last decade and those occurring before it are given and classified according to the districts, probable causes, age incidence, and occupation. Some observations are made on the effects of alcohol, character of soil, and water supply.

B. B.

CROS & DE TEYSSIER. *L'émétine dans l'amibiase hépatique.*—*Arch. Méd. et Pharm. Milit.* 1917. Oct. Vol. 68. No. 4. pp. 531–545. With 4 charts.

The general principle is laid down that in a country where amoebic dysentery is endemic any case in which the liver is painful should be suspected of being one of amoebic hepatitis or abscess. The resort to operative treatment by surgical means should only follow if previous treatment by emetine administration or, in the case of abscess, by puncture and evacuation of pus followed by injection of emetine into the cavity, have failed to cure. Malarial liver should be excluded by blood examination and quinine treatment. Details of six cases are given, in four of which cure of enlarged painful liver was effected by emetine injections. In the other two, abscess cases, emetine alone failed.

B. B.

HEYMANN & RICOU. *Un Cas de Phagédénisme cutané amibien.*—*Bull. Soc. Méd.-Chirurg. Indochine.* 1916. Feb. Vol. 7. No. 2. pp. 64-83. With 1 plate & 1 chart.

Before proceeding to the detailed account of this case the authors refer to previously reported cases of phagedenic ulceration attributed to amoebic infection. The case which they report is that of a man who was operated upon for a large abscess of the right lobe of the liver. Stool examination the day before and four days after the operation was negative as regards amoebae. Emetine was given by hypodermic injection to the amount of 30 cgm. A spreading ulceration began the eleventh day after operation. Amoebae were found in large numbers in the ulcer and intravenous injection of emetine combined later with cauterization and irrigation with quinine solution was tried. The ulcer ceased to extend but the patient died. Extensive quotation from various authors is made [cf. this *Bulletin*, Vol. 1, p. 182, 455, 710].

B. B.

GAUDUCHEAU (A.). *A propos de l'ulcère phagédénique amibien.*—*Bull. Soc. Méd.-Chirurg. Indochine.* 1916. Mar. Vol. 7. No. 3. pp. 118-121.

The author refers to the case described by HEYMANN and RICOU [see above]. He examined the amoeba from this case and found that there was nothing by which it could be distinguished either in morphology, or red cell, bacterial, or other content, from the *Entamoeba* found in liver abscess or in the intestine. The extreme virulence of the amoeba in question can, the author states, be explained satisfactorily by the nature of the associated bacteria. In his study of *Vahlkampfia phagocytoides* [this *Bulletin*, Vol. 1, p. 181] the author pointed out that culture succeeded or failed according to the kind of bacteria present in the cultures. Thus the typhoid group bacilli provided luxuriant cultures while the staphylococci did not afford good cultures. Again old amoebic cultures on transplantation on to new media grew actively but only 36 hours after the bacteria, showing that it is the bacterial growth which is responsible for the growth of the amoebae. He considers that the same stimulative effect of bacteria on amoebae may occur in the body. In the present case a bacillus producing blue pigment was found, the ulcer ceased to increase in size soon after the amoebae disappeared, and the probability is, the author thinks, that the bacteria played the part of an agent stimulating to the amoebae.

B. B.

JEPPS (Margaret W.) & DOBELL (Clifford). *Dientamoeba fragilis*. N. g. N. sp. *A New Intestinal Amoeba from Man.* (A Report to the Medical Research Committee.)—*Parasitology.* 1918. Apr. Vol. 10. No. 3. pp. 350-367. With 1 plate.

The authors give a description of an intestinal amoeba which they have discovered in the faeces of seven individuals, one of whom had never been abroad. The living amoeba may measure from 3.5μ

to 12μ , but is as a rule about 8μ to 10μ in diameter. A description of the movements and pseudopodia is given. There is no contractile vacuole, and in healthy individuals no vacuoles are seen as a rule except those containing food. The nuclear system is the characteristic feature. The amoeba is, as a general rule, binucleate; the nuclei, invisible in the living organism, are seen when stained to be exactly alike in size and structure. The size of a nucleus is about 2μ in diameter, but it varies with the size of the individual and may range from 2.3μ in very large to 0.8μ in very small individuals. Uninucleate amoebae constitute about 20 per cent. of the whole number present. The nucleus contains a large central karyosome of which the diameter is about three-fifths of that of the entire nucleus. The nuclear membrane is delicate and separated from the karyosome by a clear zone traversed by a few very fine radiating linin threads. No chromatin is present on the nuclear membrane or in the clear zone, but minute faintly stained granules can be made out sometimes at the points where the radiating threads join the nuclear membrane. The karyosome consists of a number of distinct granules of chromatin.

The food of the amoeba appears to consist entirely of small bacteria and yeasts living in the intestinal contents. The organism is found in the stools only when they are soft or diarrhoeic, and the authors consider the habitat is the colon. The Dientamoebae degenerate so soon after being passed that they must be examined on a warm stage. Cysts were never found. The authors proceed to discuss the nuclear system and the question of the classification of the organism, of which they give the general and specific diagnoses. Some notes on the history of the infected cases conclude the paper.

B. B.

DOBELL (Clifford). *Are Entamoeba histolytica and Entamoeba ranarum the Same Species? An Experimental Inquiry.* - *Parasitology*. 1918. Jan. Vol. 10. No. 2. pp. 294-310.

The author made experiments with tadpoles in order to decide whether they could be infected with *E. histolytica* or not. He refers to his previous work on *E. ranarum* and he states, "there is no constant structural character which will permit of a distinction being drawn between these two species." The tadpoles used were laboratory bred, from eggs of *Rana temporaria* artificially fertilized, special precautions being taken against contamination from the intestine in dissecting the parent frogs. After fertilization filtered tap water was added except in one culture in which unfiltered water was used. A few days after hatching the remaining egg jelly was removed and the water replaced by clean filtered water.

The experiments in feeding were carried out on groups of the tadpoles with controls. The tadpoles grew quickly on a diet of human faeces. Reingestion of the faeces went on repeatedly. It was found that although the cysts may be found alive in the gut for three weeks after the first feed no case of infection and no development of the cysts occurred. The first experiments were carried out at laboratory temperature. At 32.5°C . the results were equally negative and also the cysts died very much more rapidly—in three days as compared

with three weeks. The author concludes that *E. histolytica* and *E. ranarum* are probably distinct species and that the frog, in all probability, is not a reservoir of human amoebic dysentery. Notes on the specific name of the *Entamoeba* of human amoebic dysentery conclude the paper.

B. B.

LEGER (Marcel). **Epizootie chez le Cobaye paraissant due à une Amibiase intestinale.**—*Bull. Soc. Path. Exot.* 1918. Mar. Vol. 11. No. 3. pp. 163–166.

The author refers to the work of CHATTON [this *Bulletin*, Vol. 11, p. 251] who gives an account of experimental infections with *E. histolytica* in a guinea pig. One of the arguments used by CHATTON in favour of his experiment is that in spite of the numerous autopsies performed on guinea-pigs every year no one has demonstrated that they suffer from amoebiasis. The author contributes the following account of an epidemic among his laboratory guinea-pigs in Guiana in 1916. About 30 animals died, the disease lasting only 3 or 4 days. The symptoms were loss of appetite, rapid wasting, diarrhoea without mucus or blood, and paralysis of the hind quarters. Blood culture was negative, and no protozoa were found in the blood. At examination after death the lesions which were noticeable were confined to the large intestine and were chiefly observed in the caecum; no definite ulceration was found, but areas of congestion or areas denuded of epithelium were seen. The mucus scraped off contained amoebae, which were also observed on the day of death in the faeces passed. A description of the amoebae and cysts found is given. The author could not determine whether he was dealing with *E. histolytica* or a new species. He writes this paper in view of CHATTON's results but does not at present draw any definite conclusions as to the guinea-pig amoebae.

B. B.

- i. DECROP. **Les formes larvées de la dysenterie amibienne.**—*Presse Méd.* 1918. Mar. 7. Vol. 26. No. 14. p. 129.
- ii. ALLEN (E. S.). **Amoebic Dysentery; Results obtained from Use of Emetin.**—*Kentucky Med. Jl.* 1918. Mar. Vol. 16. No. 3. pp. 108–109.
- iii. MOURIQUAND (G.) & DEGLOS (E.). **L'entérite chronique des Amibiens.**—*Paris Méd.* 1917. Dec. 1. Vol. 7. No. 48. pp. 445–452.
- iv. DOBELL (Clifford). **Examinations for Amoebic Dysentery Infections.** [Correspondence.]—*Lancet.* 1918. Feb. 16. pp. 275–276.
- v. CHATTON (Edouard). **Mon dernier mot au sujet des enclaves kystiques des Entamibes.**—*Bull. Soc. Path. Exot.* 1918. Feb. Vol. 11. No. 2. pp. 66–67.

i. A general statement of the possible dangers of cyst carriers to themselves and others.

ii. This is a short account of a case of amoebic abscess of the liver in which rupture occurred into the bronchus. After operation and emetine treatment the patient improved in condition rapidly.

iii. This is a general paper dealing with clinical types of amoebic infection, symptoms, prognosis and treatment.

iv. Dobell criticizes the paper of MACADAM [this *Bulletin*, Vol. 11, p.243] which he considers contains passages which are misleading and which misrepresent his (Dobell's) work.

v. The author considers that until something is known about their chemical nature, "cyst inclusions" should be referred to and that names suggesting theoretical attributes should be avoided [see this *Bulletin*, Vol. 11, p. 255.]

B. B.

BACILLARY DYSENTERY.

FLORAND, BEZANÇON & PARAF. *Sur une épidémie de dysenterie bacillaire à bacille de Shiga.*—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1918. Feb. 7. 3 Ser. Vol. 34. No. 3-4. pp. 81-84.

An epidemic of 250 cases of infection of dysenteriform type occurred in the camp T. near Paris, previous to which there had been no epidemic focus in this district. The cases varied greatly in severity from the most severe to simple diarrhoea which could only be diagnosed as dysenteric by laboratory methods. In some cases there was predominance of gastric phenomena (almost incoercible vomiting). The worst cases were those in which the typical dysenteric phase was succeeded by an apyrexia phase followed by an algid collapse with a choleric termination. The patients presented at once a syndrome of very marked dehydration and profound intoxication. At autopsy lesions of typical dysentery together with marked congestive and haemorrhagic phenomena were observed.

In 43 cases Shiga's bacillus was found. The bacilli of Flexner and of Hiss were never found. The Shiga bacillus was absolutely characteristic in 37 of the 43 cases, agglutinating an anti-Shiga serum with a titre of 1 in 5,000. In 6 cases the bacilli had all the characters of Shiga's bacillus except that they were not agglutinated by any serum. The Shiga bacillus was obtained by coproculture from all the most severe and fatal cases and from 6 slight cases in addition. 26 germs belonging to the dysentery group were also isolated which were anomalous in character and difficult to classify. They were all obtained from mild cases.

The writers found all methods of treatment equally inefficacious in grave cases of dysentery, including anti-dysenteric serum, injections of glucose serum, adrenalin in big doses, the administration of potions, and collargol irrigations.

F. E. Taylor.

BEZANÇON, RANQUE, SENEZ, COVILLE & PARAF. *Étude bactériologique d'une épidémie de dysenterie bacillaire.*—*Bull. Acad. de Méd.* 1918. Mar. 26. 3 Ser. Vol. 79. Year 82. No. 12. pp. 275-277.

The systematic examination of 300 stools in the bacteriological laboratory of the Val-de-Grâce Hospital, clearly shows the importance of Shiga's bacillus in grave cases having the clinical characters of epidemic bacillary dysentery, whilst in benign cases the Shiga

bacillus is usually replaced by aberrant bacilli of the dysentery group, but not readily placed in a definite category. These aberrant bacilli fall into two groups according as to whether they form indol or not; and these again can be divided into sub-groups or categories, according to their agglutinating properties and fermentation characters. Flexner's bacillus and the bacillus of Hiss were never encountered in this epidemic, whereas in four cases where the symptoms of dysentery were present the only organism isolated from the stools was *B. paratyphosus A.*

F. E. T.

LESIEUR (Ch.), PELLAGOT (F.) & JACQUET (P.). *Sur une épidémie de dysenterie bacillaire (Epidémie de camp).*—*Arch. Méd. et Pharm. Milit.* 1917. Dec. Vol. 68. No. 6. pp. 903–910.

Prior to the epidemic at Bourges in the summer of 1916 recorded by DURAND (78 cases with 2 deaths) bacillary dysentery was unknown in that neighbourhood. In August 1917 an epidemic occurred in camp X comprising 182 cases including 105 cases of diarrhoea. 77 were admitted to hospital and there were 3 deaths. 49 of the most severe cases were examined bacteriologically. Early and repeated injections of Dopter's antidysenteric serum in minimal daily doses of 40 cc. produced good effects.

The writers conclude that in the presence of diarrhoea, however simple in appearance, under conditions favourable to epidemic extension it is most important to diagnose dysentery as soon as possible, so as to isolate and treat the patients admitted to hospital. To this end all the laboratory measures at our disposal ought to be employed, including cytology, coproculture, serodiagnosis, etc. The stools, in particular, should be examined as fresh as possible. The importance of hygienic measures in prophylaxis is insisted upon.

F. E. T.

LANCÉLIN (R.) & RIDEAU (I.). *Recherches épidémiologiques, bactériologiques et anatomo-pathologiques au cours d'une épidémie de dysenterie bacillaire observée à Brest en 1916.*—*Arch. Méd. et Pharm. Nav.* 1917. Nov. & Dec. Vol. 104. Nos. 5 & 6. pp. 360–367; 445–453: 1918. Jan. Vol. 105. No. 1. pp. 47–62.

An epidemic of dysentery occurred at Brest during the latter half of 1916 and presented a classic picture of this condition. In the marine hospital 202 cases were treated with 8 deaths, a large number of cases occurring also in the civil population. The first case to be observed occurred in an Austrian prisoner of war in an internment camp and 41 of the 202 cases occurred amongst German and Austrian prisoners of war.

In 197 of the 202 cases the bacterial findings were:—

Flexner's bacillus	..	..	..	102 cases
Shiga's bacillus	..	..	..	27 „
Negative results	.	.	.	68

The bacteriology of the organisms is stated in the following table : —

Classification.	Number of Cases.	Fermentation.						Indol.	Agglutination.		Pathogenicity for Rabbits on Subcutaneous Injection.
		Dextrose.	Maltose.	Saccharose.	Levulose.	Galactose.	Mannite.		Anti S.	Anti F.	
Flexner	46	0	+	+	0	0	+	Inconstant	0	+	Survived.
Shiga	12	0	0	0	0	0	0	0	+	0	Dead on 3rd day
Para-Flexner ..	4	0	+	0	0	0	+	0	0	+	Survived.
Non-classified (Paradysenteric)	11	0	0	0	0	0	0	0	0	0	Dead in 20 hrs.

The Flexner dysenteries were the more numerous and more benign in character with a mortality of 4·96 per cent. The Shiga dysenteries were much less numerous, but much more severe, having a mortality of 11·11 per cent.

The curative effect of the serum of VAILLARD and DOPFER appeared to be very unequal in different cases. Emetine was often employed with good results although amoebae were never found. The axiom that amoebic dysentery should be treated with emetine and bacillary with serum was shown to be in default in many cases in this epidemic at Brest.

The results of the agglutination test on 138 sera were as follows : —

Number of sera agglutinating Shiga alone above	1/50	..	9
" " " " Flexner " "	1/150	..	67
" " " " Shiga at 1/50			
with coagglutination of			
Flexner above	1/150	..	15
" " " agglutinating Flexner above			
1/150 with coagglutination			
of Shiga at 1/50 (Flexner			
isolated from the stools)	..	..	6
" " " not agglutinating .. ..	..	..	41

From the point of view of laboratory diagnosis coproculture should be associated with sero-diagnosis, the two procedures supplementing each other.

In the 8 fatal cases autopsies were performed 7 times. Lesions are described in the intestine, liver, kidney and suprarenal capsule. The authors consider that in grave cases the hepatic lesions, by reason of glandular insufficiency, contribute largely to the fatal result.

F. E. T.

MAYERHOFER (E.) & VON REUSS (A.). *Epidemiologische und klinische Beiträge aus der abgelaufenen Ruhrepidemie des Sommers 1917 in Baden-Leesdorf.* [Epidemiological and Clinical Contributions to the Dysentery Epidemic in Baden-Leesdorf in the Summer of 1917.]—*Med. Klinik.* 1918. Jan. 27. Vol. 14. No. 4. pp. 79-84.

During the summer and autumn of 1917 an epidemic of 221 cases of Shiga-Kruse dysentery occurred at Baden-Leesdorf, more cases being observed among the civil population on account of their inferior hygienic and dietetic conditions than among the troops. Fatal cases were mainly seen in children and in old people, being only seen in middle life when complicated by tuberculosis, or gastric or other serious disease. The epidemic was accompanied by numerous complications including suppurative parotitis, appendicitis, conjunctivitis, polyarthrititis, phlebitis, oedema, icterus, pleuropericarditis, peritonitis, and dysuria without cystitis or urethritis. The spread of the disease was successfully combated by isolation of the cases. Good results were obtained by the use of a specific anti-Shiga-Kruse serum.

F. E. T.

SCHIEHMANN (O.). *Beiträge zur serologischen Ruhrdiagnose.* [Contributions to the Serological Diagnosis of Dysentery.]—*Ztschr. f. Hyg. u. Infektionskr.* 1916. Nov. 23. Vol. 82. No. 3. pp. 405-434.

Formerly the positive agglutination of Shiga-Kruse bacilli with a 1 in 50 dilution of patient's serum was accepted as evidence of dysenteric infection; more recent observations have shown that this may occur as a co-agglutination in patients who have been inoculated for typhoid or cholera, as well as in certain other diseases. This fact has greatly altered the meaning and importance of the agglutination test in the diagnosis of dysentery. The agglutination of Shiga-Kruse bacilli in patients' sera in 1 in 50 dilutions are only of diagnostic importance when the sera are shown to react negatively to typhoid, paratyphoid A and paratyphoid B bacilli; when they react positively to any of these bacilli agglutination of Shiga-Kruse at 1 in 50 is most probably only a co-agglutination; to be of value in diagnosis the agglutination should be positive at 1 in 100.

Schiemann relies more upon the character of the agglutination, a coarse clumping agglutination being specific and not obtained as a co-agglutination. The exact conditions for this form of agglutination require further research for their elucidation. Shaking the tube in which the coarse clumping agglutination is seen should be avoided, as the irregularity in form and size of the agglutinated particles, which constitute the characteristic feature of this reaction, become destroyed by it.

F. E. T.

ANDREWES (F. W.). *Dysentery Bacilli: the Differentiation of the True Dysentery Bacilli from Allied Species.*—*Lancet.* 1918. Apr. 20. pp. 560-563.

Organisms related to, but not fully identical with, dysentery bacilli are commonly encountered in the bacteriological examination of

cases of suspected dysentery and convalescents. The departure in character from true dysentery bacilli may be either cultural or serological. Much doubt exists as to the significance of these atypical dysentery bacilli, and caution is necessary before assuming a causal relation with the disease.

Upwards of one hundred strains of atypical dysentery bacilli obtained from France and from dysentery hospitals at home have been examined, chiefly by cultural and serological methods. Their characters show them to fall into three species or groups of series to which the names *B. ambiguus*, *B. alkalescens* and *B. dispar* have been provisionally given.

The common reactions of the types concerned (to which occasional exceptions have been noted) are given and compared with true dysentery bacilli in the following table:—

	Sugar reactions.				Indol formation.	Alkali formation.	Acid agglutination.	Agglutination with specific dysenteric sera.	Pathogenicity for rabbit.
	Lact.	Gluc.	Mann.	Dulc.					
<i>B. Shiga</i> ..	+	+	—	—	—	Slow	—	To titre with Shiga Ser.	Very high.
<i>B. ambiguus</i>	+	+	—	—	+	„	+	Negative with Shiga Ser.	Prac. neg.
<i>B. Flexner-Y</i>	—	+	+	—	+	Mod.	—	To titre with Flexner-Y Ser.	Marked.
<i>B. alkalescens</i>	—	+	+	+	+	Vig.	+	Negative with Flexner-Y Ser.	Negative.
<i>B. dispar</i> ..	+	+	+	—	+	„	+	Negative with Flexner-Y Ser.	Marked.

The species described as *B. ambiguus* and *B. alkalescens* seem fairly well defined and do not cause dysentery, nor can the lactose fermenters grouped under the name *B. dispar* be returned as dysentery bacilli.

The writer believes that the acid-agglutination test of MICHAELIS [see this *Bulletin*, Vol. 11, p. 263] will be of great value and will do what no one specific serum, or even a number of specific sera, can do.

Before returning a bacillus as inagglutinable it should be subcultured daily in broth, formalinised, and then kept for a few days in the cold; after which treatment it may agglutinate readily. Further, in returning a bacillus as agglutinable it should be stated whether it agglutinates to the full titre of the serum, or only to half or quarter titre, and the method employed should also be mentioned. All doubtfully pathogenic forms isolated from a case of suspected dysentery should have their power of agglutination with the patients' serum tested, as this constitutes an important link in the chain of evidence.

F. E. T.

THOMSON (J. Gordon) & HIRST (L. F.). **Reports from the Pathological Laboratories of No. — General Hospital, Alexandria. I. Bacillaemia due to Various Organisms.** By Capt. Thomson & Capt. Hirst. **II. The Thermo-Precipitin Reaction as an Aid to the Rapid Diagnosis of Bacillary Dysentery.** By Capt. Hirst.—*Lancet*. 1918. Apr. 20. pp. 566–567.

II. The technique of MISSIROLI was followed [see this *Bulletin*, Vol. 6, p. 466], boiled-filtered saline emulsions of freshly passed stools being employed for testing with antidysenteric sera. Where a positive reaction was obtained the results were weak in comparison with those obtainable by the method from extracts of men or animals dead of septicaemic plague against Yersin's serum.

Good reactions within five minutes have been obtained with heated broth extracts of *B. dysenteriae* (Shiga) against the serum of a hyperimmunised rabbit, and within 15 minutes with the Lister Institute therapeutic serum.

The writer considers that with an improved technique and the use of high potency sera prepared specially for the purpose rapid reactions should be obtained in most cases of bacillary dysentery in the acute stage, and that the reaction is highly specific for the different groups of dysentery bacilli.

F. E. T.

FLETCHER (William). **Report upon the Bacteriological Examination of One Thousand Soldiers Convalescent from Diseases of the Dysentery and Enteric Groups.**—*Jl. Roy. Army Med. Corps*. 1917. Nov. & Dec. Vol. 29. Nos. 5 & 6. pp. 545–559; 679–693. With 6 charts: 1918. Jan. Vol. 30. No. 1. pp. 51–75. With 1 fig.

This is a long and involved paper in three parts which, as far as it elates to dysentery, can best be abstracted by quoting the summary and conclusions as given by the author:—

“(8) *Carriers of B. dysenteriae* (Shiga).

“Among 800 men, only one carrier of true *B. dysenteriae* of the Shiga type was isolated; he was a chronic faecal carrier, and had served both in the East and in France.

“(9) *Carriers of B. dysenteriae* (Mannite-fermenting).

“(a) Dysentery organisms of the mannite-fermenting type were isolated from the faeces of eighteen men, i.e., 2.25 per cent., but in no instance were they found later than the ninth week after the commencement of illness, and in only one case later than the fifth week.

“(b) The infection was discovered at the first examination twelve times; at the second examination four times; and at the third examination twice.

“(c) In only three cases were the organisms isolated on more than a single occasion.

“(d) The strains isolated, for the most part, gave atypical serum reactions, but they approximated to the *B. dysenteriae* (Y) of Hiss and Russell.

“(e) Infections with organisms of the mannite-fermenting group of dysentery organisms appeared to be common, but of short duration.

“(10) *Carriers of Mixed Bacillary Infections*.

“(a) Three men were carriers of mixed infections of pathogenic organisms. One was a chronic carrier of paratyphoid of both the ‘A’ and ‘B’ types. The second was a convalescent carrier of *B. dysenteriae*

(Y), who became a 'precocious carrier' of *B. paratyphosus* B. The third was a chronic carrier of *B. dysenteriae* of the Shiga type, who also became a precocious carrier of *B. paratyphosus* B.

"(12) *The Treatment of Bacillary Carriers*

"(a) Carriers of *B. paratyphosus* A and B, of *B. dysenteriae* (Shiga), and of *B. dysenteriae* (Y), were treated with autogenous vaccines; they were also fed with media containing lactose-fermenting bacilli and cocci, but there was no evidence that the methods adopted exercised any influence upon the infection.

"(b) Experiments, made *in vitro*, at room temperature, did not show that Professor Westergaard's streptococcus had an inhibitory action upon the growth of *B. dysenteriae* of the Shiga type, or upon paratyphoid organisms."

F. E. T.

MORSE (Mary Elizabeth) & TRYON (Geneva). **An Epidemic of Dysentery at the Boston State Hospital, due to a Member of the Paratyphoid-Enteritidis Group.** -- *Boston Med. & Surg. Jl.* 1917. Aug. 9, 16 & 23. Vol. 177. Nos. 6, 7 & 8. pp. 173-180; 216-220; 255-260. With 3 charts.

An epidemic of "asylum dysentery" occurred in the Boston State Hospital in 1915 and 1916. The epidemic was preceded by mild diarrhoeas among patients and attendants, then broke out in violence in one ward, and was passed from person to person by contact. The source of the infection was not definitely determined. The causative organism was found to be a member of the Paratyphoid-enteritidis group, more closely allied, as shown by agglutination tests, with paratyphoid B, *B. suipestifer* and *B. enteritidis* than with paratyphoid A, but not identical with any of them. The close affinity of this organism with certain members associated with animals (*suipestifer* and *enteritidis*) suggests the possibility of such an origin, possibly due to the contamination of food by rats. Vaccine treatment during the disease gave good results. The disease has now become endemic and has assumed a mild form. A polymorphonuclear hyperleucocytosis occurred after both the prophylactic and therapeutic administration of vaccine. The leucocytic reaction was more marked in the stronger normal individuals than in the feeble ones who have had the disease and recurrent attacks.

Agglutinin formation in the disease was very moderate, but persisted for 14 to 17 months after the original attack where no recurrence has been noted. After prophylactic vaccination low titres were obtained up to 11 months. Intradermal tests with concentrated glycerine broth cultures of members of the paratyphoid-enteritidis group have given unreliable and conflicting results.

F. E. T.

MEYER (K. F.) & STICKEL (J. E.). **Some Epidemiologic and Bacteriologic Observations on Paradyntery Infections in California.**—*Collected Reprints from the George Williams Hooper Foundation for Medical Research.* 1916-1917. Vol. 2. (Reprint from *California State Jl. Med.* 1917. May.)

Bacillary dysentery does not seem to have been recognised in California prior to October 1914 when three cases were observed in the State. In October and November 1914 the writers isolated

B Morgan No. 1 from the stools in a small house epidemic of infectious diarrhoea which occurred in a children's sanatorium in San Francisco. An extensive epidemic of dysentery occurred in Napa in March 1916, during which a bacillus belonging to the so-called Para-dysentery Group I or Hiss-Y-Russell type was isolated and identified by agglutination.

The writers have now isolated three types of para-dysentery bacilli in California, namely, Group I or Hiss-Y-Russell Group in one epidemic, Group II or Flexner Group in three epidemics and in two sporadic cases, and Group III (Sonne) in one sporadic case, showing that these three types exist in epidemic or endemic form in California. They further believe that infantile diarrhoea is, in some cases, due to paradysentery bacilli and should be frankly designated as "infantile dysentery," that bacteriologic stool and blood examinations should be supplemented by agglutination tests of the patient's serum and that to further our knowledge of the epidemiology of paradysentery in California, systematic stool examinations of acute and chronic cases of colitis should be made.

F. E. T.

WHITMORE (E. R.) & FENNEL (E. A.). **An Experimental Investigation of Lipovaccines. An Additional Note, with a Note on Triple Dysentery Lipovaccine.**—*Jl. Amer. Med. Assoc.* 1918. Mar. 30. Vol. 70. No. 13. pp. 902-904.

Whitmore and Fennel believe that a dysentery lipo-vaccine would have a special advantage over a dysentery saline vaccine, in that its slow absorption would reduce its reaction.

The lipovaccine is made by growing the bacteria in Kolle flasks, scraping off the growth, freezing and drying it *in vacuo* and emulsifying it in lanoline or oil by grinding in a ball mill, using glass bottles and steel balls. The oils can be sterilized by steam at 15 pounds for 15 minutes, by heating to 90° C for ten hours on a water bath, or by mixing with potassium iodide.

A lipovaccine containing 3,000 million Shiga, 3,200 million Y and 2,200 million Flexner dysentery bacilli may be administered to guinea-pigs in doses of 6 cc. without ill effect. In men 1 cc. of this lipovaccine produces no marked local or general reaction. Agglutininus, precipitins and bacteriolysins are produced in the blood of vaccinated animals and men, and there is some evidence of complement fixation.

F. E. T.

BOEHNCKE. **Ruhrschutzimpfung im Kriege.** [Protective Inoculation against Dysentery in the War.]-*Med. Klinik.* 1917. Oct. 14. Vol. 13. No. 41. pp. 1083-1084.

Although the hygienic conditions of peace times render unnecessary special prophylactic inoculations against "pseudo"-dysentery and the production of passive immunity by serum prophylaxis suffices for "true" dysentery, the applied field hygiene of the present war leaves much to be desired in the prevention and control of dysentery. In this disease, as in the other infective diseases of the intestinal tract, typhoid and cholera, the aid of specific prophylaxis must be invoked. In the protective inoculation prepared by Boehncke a 0.5 per cent.

carbolised mixture is made comprising dysentery bacilli in the widest sense (i.e., including both true and pseudo-dysentery bacilli) + dysentery toxin + dysentery antitoxin (Dys. bac. TA). The prophylactic inoculation of this dysbacta consists of three doses of 0·5 cc., 1·0 cc., and 1·5 cc., respectively at five days' intervals. General and local reactions are said to be slight. Where time is pressing two inoculations may be given, viz., 1 cc., followed in six days by 2 cc., in which case the reactions though more marked are still mild. By the use of dysbacta the spread of dysentery has without exception been arrested both among the troops and the civil population in infected areas, whilst the production of agglutination in the serum of those inoculated is quoted as proof of its specific action.

F. E. T.

STEUERNAGEL. Ruhrschutzzimpfung mit Dysbacta-Boehncke. [Protective Inoculation for Dysentery with D-B.]-*Deut. Med. Woch.* 1918. Mar. 21. Vol. 44. No. 12. p. 317.

The writer claims to have obtained good results from the prophylactic use of Dysbacta-Boehncke in 15,000 subjects, giving two injections, the first 1 cc. and the second 2 cc. eight days later, instead of the three doses of 0·5, 1·0 and 1·5 cc. at intervals of five days as practised by BOEHNCKE. Except for errors of technique the injections were reactionless. The best results were obtained by intradermic injections at a point two-fingers' breadth below the clavicle close to the edge of the sternum.

F. E. T.

BEYER (J.). Erfahrungen über Ruhr und Ruhrserum. [Experiences of Dysentery and Dysenteric Serum.]-*Deut. Med. Woch.* 1918. Jan. 24. Vol. 44. No. 4. pp. 98-99.

An epidemic of dysentery observed by the writer in July to November 1917 comprised 109 cases (mostly Y cases, 10 per cent. Shiga-Kruse, 5 per cent. Flexner) and 130 cases of clinical dysentery in which no causal organisms were found. In the former class the average period of treatment was 38½ days and no death resulted; in the latter the average duration of treatment was 42 days and 4 deaths resulted. The Höchst dysentery serum was employed without delay in doses of 10 to 20 cc. daily in fresh cases, and similar doses with pauses of one to seven days' duration in chronic cases. As soon as the strain of dysentery bacillus was ascertained a polyvalent specific Y or Shiga-Kruse serum was similarly employed. The total amount of serum administered in a single case was 150 cc. The cases of clinical dysentery were also treated with serum. The subcutaneous injections of serum were soon abandoned because of the frequency of erythema and urticaria. These conditions were seldom seen after intramuscular injections and never after intravenous. Favourable results were attributed to the use of the serum, these favourable results being the more rapid and certain the earlier the injections were employed. In severe and moderately severe cases the medicaments usually used in dysentery were also indicated. The serum appeared to exert no influence on cases of dysenteric arthritis.

F. E. T.

VON SZILY (Paul) & VERTES (Alexander). **Zur Chemotherapie der Ruhr.** [On the Chemotherapy of Dysentery.]—*Wien. Klin. Woch.* 1918. Jan. 24. Vol. 31. No. 4. pp. 95-97.

The authors quote several examples in support of the opinion that the parenteral introduction into the organism of various toxic substances can stimulate the production of non-specific bodies capable of increasing the resistance of the organism and so producing immunity. These toxic-stimulating bodies include many chemical substances, as well as serum, both normal and antitoxic. They claim that anti-dysenteric serum acts in this way by means of nonspecific substances which it contains. They also claim to have obtained strikingly good results in the treatment of dysentery whether due to the Shiga-Kruse, Flexner or Y bacillus, by the intramuscular injection of 1 to 2 cc. daily for three successive days of the following solution :—

Hydrarg. bichlor.	..	..	..	..	1.4
Sodii arsenicosi	..	..	..	..	0.5
Sodii iodati	..	..	..	..	24.0
Aq. dist.	..	..	..	..	100.0

F. E. T.

FOERSTER (Alfons). **Ein Fall von Zystopyelitis, hervorgerufen durch Ruhrbazillen (Typus Flexner).** [A Case of Cysto-Pyelitis caused by the Dysentery Bacillus (Type Flexner).]—*Münch. Med. Woch.* 1918. Feb. 19. Vol. 65. No. 8. pp. 205-206.

In August 1915 a sanitary officer on active service on the Russian front was admitted to hospital for bacillary dysentery of moderate severity. After some weeks he was discharged cured and free from bacilli. Some sensibility of the intestine persisted, however, and the patient was kept on home service. In April, 1916 he was suddenly seized with rigors, pyrexia and all the symptoms of an acute pyelitis of the left kidney with descending infection of the bladder. A pure culture of Flexner's dysentery bacillus was grown from the urine. The stools were of normal consistency, and repeated examination failed to reveal the presence of dysentery bacilli.

In addition to the ordinary general treatment an autovaccine was administered twice weekly, causing a moderate reaction. In twelve weeks the general symptoms had greatly improved, but the condition of the urine remained unaltered. On leaving off the vaccine a relapse of the acute symptoms occurred, and after longer or shorter intervals eight relapses have been observed.

F. E. T.

NOWICKI. **Ruhrfälle mit dem Nachweise des Erregers ausserhalb des Darmtractus.** [Cases of Dysentery with Demonstration of the Bacilli outside the Gut.]—*Berlin. Klin. Woch.* 1917. Dec. 24. Vol. 54. No. 52. pp. 1237-1239.

Nowicki records four cases of dysentery, three of which came to autopsy. Agglutination was frequently positive. The Shiga-Kruse

In amoebic dysentery the necessity is pointed out of distinguishing the cysts of *Entamoeba histolytica* from those of *E. coli*, *E. nana* (Wenyon) and amoebae of the *Limax* type; and of flagellates, including *Lambia*, *Cercomonas*, *Prowazekia*, *Bodo*, and *Blastocystis*, which was considered by ALEXEIEFF to be a vegetable organism, but which now appears in reality to be the cyst of a flagellate, probably *Trichomonas*.

The following ciliates have been found in human faeces :—

1. *Balantidium coli* Malmsten; 2. *Colpoda cucullus* Schutz; 3. *Balantidium minutum* Schaudinn; 4. *Uronema caudatum* Dujardin; 5. *Nyctotherus faba* Schaudinn; 6. *Nyctotherus africanus* Castellani; 7. *Nyctotherus giganteus* Krause; 8. *Balantidium Italicum* Sangiorgi & Ugdulena.

Of this number the only one which will certainly give rise to the dysenteric syndrome is *Balantidium coli*, cases of which the author has seen in the Philippine Islands, in Ceylon, and in the Balcanic Zone.

The flagellates found in human faeces include *Cercomonas*, *Bodo*, *Prowazekia*, *Trichomonas*, *Tetramitus*, *Tetratrichomonas*, *Pentatrichomonas*, *Trichomastix*, *Enteromonas* and *Lambia*, but there exists considerable doubt as to the pathogenicity of these organisms.

Castellani has seen one case of spirochaetal dysentery in Macedonia. These cases are said to be due to the *Spirochaeta eurygyrata* and Castellani points out the danger of confounding the vibrio bacillus described by himself in 1904 as *B. zeylanicus* with spirochaetes, as this organism is very pleomorphic, often appearing as a spirillum and being very abundant in dysenteric stools.

Castellani recognises two groups of organisms in bacillary dysentery :

Group I. Non-mannite fermenters, including practically a single variety, the *B. dysentericus* Shiga-Kruse.

Group II. Fermenting mannite with the production of acid; comprising :—

(1) Type Y, Hiss and Russell; acidifies mannite and monosaccharides.

(2) Type Strong; acidifies mannite, monosaccharides and saccharose.

(3) Type Flexner Manila (*sensu stricto*): acidifies mannite, monosaccharides, saccharose, maltose and dextrine.

(4) *B. paradysentericus ceylon* Castellani, with sugar reactions like Shiga-Kruse, but producing slight permanent acidity in milk.

(5) Type *metadysentericus* Castellani, distinguished from all the rest by fermenting lactose.

Serologically, the Shiga-Kruse bacillus is agglutinated only by homologous sera. The differentiation of the Flexner bacilli can only be accomplished with difficulty even using the methods of saturation

of agglutinins. The Flexner bacillus *sensu stricto* and the Hiss bacillus are often well agglutinated by Shiga serum, and also by normal horse serum.

To obtain dysentery bacilli from the stools suitable colonies are picked off the surface of MacConkey, Endo or Conradi-Drigalski agar and submitted to a gas-agglutination test by inoculating tubes of glucose broth containing anti-dysenteric sera [see figs. 1 to 3].

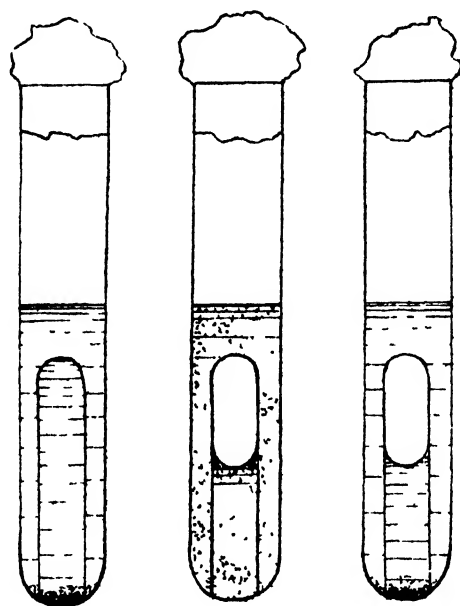


Fig. 1.

Fig. 2.

Fig. 3.

Schematic figure showing the mixed gas agglutination test.

- Fig. 1. Tube of glucose broth and mixed Shiga-Flexner antidysenteric serum + Shiga of Flexner bacilli; absence of gas and presence of agglutination (no bubble of gas, clear liquid with sedimentation).
- Fig. 2. Tube of glucose broth + mixed Shiga-Flexner antidysenteric serum + *B. coli*; Presence of gas and absence of agglutination (bubble of gas with liquid uniformly turbid).
- Fig. 3. Tube of glucose broth + mixed Shiga-Flexner antidysenteric serum + coliform bacillus showing nonspecific agglutination (bubble of gas and clear liquid with sedimentation).

Treatment is summarised as follows:—in the amoebic form the double iodide of bismuth and emetine; in the bacillary form salines at the commencement, then astringents in massive doses, and intestinal irrigation in subacute and chronic cases, serum being useful in a certain number of cases.

An elaborate table showing the characters of the various members of the group of aerobic asporogenic intestinal bacilli is appended.

F. E. T.

CRAGG (F. W.). **Observations on Dysentery Cases from Mesopotamia.**
—*Indian Jl. Med. Res.* 1917. Oct. Vol. 5. No. 2. pp. 301-329.

During the second half of 1916 and the first two months of 1917, examinations of the stools were made in 613 cases invalided from Mesopotamia on account of dysentery and allied complaints. The condition of the patients on admission varied from time to time. In the early months the majority of the cases were comparatively recent; they were mostly either convalescents sent to India to recruit after severe or prolonged illness, or had obstinate chronic symptoms. 1,543 stools, or an average of two and a half per case, were examined for protozoa with the following results :-

	Single Infections.	Multiple Infections.	Total.
<i>E. histolytica</i>	31	33	64
<i>E. coli</i>	77	64	141
<i>E. nana</i>	—	6	6
<i>Lambia intestinalis</i> ..	39	30	69
<i>Trichomonas intestinalis</i> ..	31	27	58
<i>Tetramitus mesnili</i> ..	6	9	15
<i>Isospora</i>	1	3	4
Undetermined flagellates	3	8	11
"I Cysts"	—	3	3

In 64 cases in which *E. histolytica* was found there were : -

	Cases.
Free form alone	15
Free form, cysts found subsequently in same case	2
Free form, with other protozoa	11
Cysts alone	14
Cysts, with other protozoa	22

In all these cases there was a history of one or more attacks of acute dysentery. In eight of the cases in which the free amoeba was found the patient was suffering from an acute relapse. In one of these, a very severe case, the Shiga bacillus was also isolated. In two cases of chronic amoebic dysentery bacilli of the Flexner and Y groups respectively were isolated.

E. coli was found either free or encysted in 52 per cent. of the stools examined. It was never observed in cases of acute dysentery and in chronic cases was often found in the faecal matter of the stools. In some cases it was found during quiescent periods of the disease, then disappeared on the occurrence of a relapse, to reappear in convalescence. *Lambia* was found to be a common inhabitant of the intestine in the cases examined, and doubts are cast on the pathogenicity of this organism. as well as of the *Trichomonas*. *Tetramitus mesnili* was probably more frequent than the figures indicate, and there was nothing to suggest that this flagellate had any relation to the patients' condition.

Bacteriological examination was undertaken in 96 cases, with the following results :—

	Acute Cases.	Chronic Cases.	Total.
<i>E. histolytica</i> present :—			
Shiga bacillus	1	—	1
Flexner bacillus	—	1	1
Y bacillus	—	1	1
<i>E. histolytica</i> not found :—			
Shiga bacillus	5	13	18
Shiga bacillus and Morgan No. 1 bacillus	—	2	2
Flexner bacillus	1	2	3
Y bacillus	—	1	1
Morgan No. 1 bacillus ..	1	5	6
	8	25	33
Negative results :—			
<i>E. histolytica</i> present ..	2	5	7
<i>E. histolytica</i> absent ..	4	52	56
Total negative cases ..	6	57	63
Total cases examined	14	82	96

From these figures Cragg believes that, whatever be the cause of acute dysentery in Mesopotamia, it is the bacillary cases which make up the great majority of those who eventually reach the base on account of dysentery. He also agrees with WENYON & O'CONNOR that one cannot regard the presence of cysts of *E. histolytica* as evidence that the patient has suffered from amoebic dysentery.

The carrier problem is then discussed, it being pointed out that there is an essential difference between the "cyst carrier" and the men who excrete dysentery bacilli. The latter are really mild chronic cases of dysentery in which the men are generally in sufficiently good health to do duty, and excrete bacilli intermittently in their stools : they are also suffering from a disability which is likely to render them unfit when subjected to any severe strain and are then likely to relapse. Their detection is of great importance and demands repeated examination of the stools, which should be made when the patient is on full diet and taking exercise, and not living under hospital conditions on light diet. The writer considers that there is much to be said for a course of field service rations as the final test as to whether a dysentery convalescent is fit to resume his previous life.

F. E. T.

CUNNINGHAM (J.) & KING (H. H.). **Dysentery in the Jails of Eastern Bengal. Being the Report of a Special Investigation conducted under the Auspices of the Indian Research Fund Association.**—*Indian Jl. Med. Res.* 1917. Oct. Vol. 5. No. 2. pp. 330–339.

"The conclusions which are warranted from the observations which have been described in this paper are as follows :—

"(1) The great majority of cases of jail dysentery, when admitted to hospital, tend to get better of their immediate symptoms without any medical treatment. A restricted diet is sufficient to bring about this result and no better results can be produced by the more complete rest obtained by withholding all food while the acute symptoms are present.

"(2) The disappearance of the actual dysenteric symptoms is hastened to a certain extent by the administration of a slight purge such as a mixture containing soda and magnesium sulphate or grey powder.

"(3) Salts appear to be superior to grey powder in the treatment of these cases, for the former causes the symptoms to disappear earlier and prevents immediate recurrences ('relapses in hospital') to a greater extent than the latter.

"(4) None of the treatments tested appeared to have any influence upon the shortening of the convalescent stage of the disease (the length of stay in hospital).

"(5) Treatment by a Shiga vaccine did not appear, as far as our cases went, to have any special advantage over other forms of treatment.

"(6) The cases treated with emetin gave the same results as those treated with rest alone. Improvement following injections of this drug are, therefore, of no diagnostic value in the majority of cases of jail dysentery."

F. E. T.

TYAU (E. S.). *The Parasitology of Dysentery.*—*National Med. Jl. of China.* 1917. Dec. Vol. 3. No. 4. pp. 142-146. With 1 plate.

This paper describes the animal parasites most commonly found in cases of dysentery met with in Shanghai, emphasis being laid on those of most frequent occurrence, the bacteria not being dealt with. In Shanghai dysentery is caused by one or other of the following parasites, viz., *Entamoeba histolytica*, *Paramoeba* of CRAIG, *Balantidium coli*, *Leishmania*, *Laverania malariae*, *Schistosoma* and *Ankylostoma*. Of these organisms the *E. histolytica* is the most important and when present in the stools is easy to find.

Four cases of craigiiasis due to paramoebic infections were observed. According to BARLOW there are two types of craigiiasis due to two different parasites, viz., *Craigia hominis* and *C. migrans*, each having a life cycle of two different stages.

Two cases of Lamblia infection were observed, and one fatal case of dysentery caused by a ciliate. The patient was a beggar picked up in the road by the police and sent to hospital in a moribund condition. He passed several dysenteric stools, and died on the following day. In the stools were found a number of *Balantidium coli*.

F. E. T.

EWALD (Gottfr.). *Ueber das Blutbild bei Dysenterie.* [The Blood Picture in Dysentery.]—*Folia Haematologica.* 1918. Jan. Vol. 22. No. 2. pp. 1-3.

Ewald describes the blood changes observed in dysentery [probably bacillary, though this is not definitely stated] as observed in the blood counts of 39 cases. Two different blood pictures were obtained, viz. :—

(1) In uncomplicated cases of dysentery. Here the leucocyte count is normal or slightly raised with a tendency to an increase in

the lymphocytes (up to 40 per cent.) and in the eosinophiles (up to 8 per cent.).

(2) In cases of mixed infection, and when complications and sequelae ensue. Here leucocytosis is seen, frequently up to 20,000, and the percentage of polymorphonuclears is raised whilst that of the lymphocytes is diminished with disappearance of the eosinophiles. The presence of eosinophilia renders the prognosis more favourable, although secondary infection may subsequently occur and change the outlook. Even when the clinical symptoms are favourable, patients with secondary infection should not be allowed to travel.

F. E. T.

MOURIQUAND (G.) & DEGLOS. L'avenir militaire des dysentériques. Les fonctions digestives chez les dysentériques bacillaires et amibiens; troubles immédiats et tardifs.—*Bull. et Mém. Soc. Méd. Hôpît. de Paris.* 1917. Jan. 18. 3 Ser. Vol. 33. No. 1-2. pp. 22-30.

In the epidemic of dysentery observed by the authors in the autumn of 1916, sequelae were seldom observed in the bacillary dysenteries but were very frequent in the amoebic varieties. The bacillus most frequently isolated by them was closely allied to Flexner's bacillus, having slightly different sugar reactions, and being feebly agglutinated by antiserum.

The amoebic cases observed were mostly received in a chronic condition, having been sent home from the East for amoebic dysentery after a sojourn of from three to five months. In more than half the cases *Entamoeba histolytica* or *E. tetragena* or amoebic cysts were found either during a subacute crisis or during the course of a prolonged diarrhoea. The association of various parasites was observed in many cases, especially *Trichomonas intestinalis*, *Lambia* and its cysts, the ova of *Tricocephalus* twice, those of *Ascaris* once and abundant spirilla quite rarely. Sometimes repeated examinations of the stools were necessary to discover the cysts, often with the use of special methods.

The various troubles which may arise are discussed under three headings—(1) Subacute crises which yield to emetine. (2) Persistent chronic diarrhoea causing wasting and extreme depression. (3) Intestinal disturbance showing the presence in the stools of the cells described by MATHIEU as characteristic of mucous colitis.

The writers add a note of warning on the inefficacy of returning a soldier to the effective list until the dysenteric syndrome is thoroughly cured and the stools are free from cysts.

F. E. T.

ROCCAVILLA (Andrea). Diarree ed enterocoliti dissenteriformi in alcuni settori del nostro fronte. [Diarrhoea and Dysenteric Enteritis on the Italian Front.]—*Riv. Crit. Clin. Med.* 1918. Apr. 6, 13 & 20. Vol. 19. Nos. 14, 15 & 16. pp. 157-161; 169-175; 181-189.

The author's comments on the cases of diarrhoea and dysentery which came under his notice on the Italian front, are substantially the same as those of a large number of other Italian surgeons. . Whilst

about one-half of the cases showed typical Shiga and Flexner bacilli, various coliform bacilli of atypical type were isolated from the remainder. A table showing the reactions obtained with eight different varieties is given.

J. B. Nias.

STRAUSS (H.). *Zur Behandlung von Folgezuständen der Ruhr.* [On the Treatment of the Sequels of Dysentery.]—*Therapie der Gegenwart.* 1917. Dec. Vol. 58. No. 12. pp. 409-414. With 1 fig.

The sequels of dysentery are now seen earlier and more frequently on account of the increase of dysentery and dysentery-like diseases during war time. Strauss enumerates the various sequels he has met with, and points out that for the relief of the chronic bowel sequels of dysentery surgical intervention should only be undertaken after prolonged treatment by rest, careful dieting, and medication have been tried. The three operative procedures which are applicable to these conditions are, (1) Appendicostomy, introduced by WEIR in 1902; (2) The production of a caecal fistula, introduced by FOLET in 1885; and (3) The production of an artificial anus. All three procedures permit of the irrigation of the diseased bowel from above, whilst the two latter also allow the faeces to escape. Appendicostomy is the simplest and easiest of these operations to perform and is attended by the lowest mortality.

Turning to local treatment a very large number of substances are described as having been topically employed either in solution as enemata, or as powders administered through a specially designed rectal insufflator which is figured in the text. The article concludes with a discussion of the disturbances of the stomach and small intestines which so frequently occur as sequels of dysentery, especially subacidity and achylia gastrica.

F. E. T.

NOC (F.). *Remarques sur la vaccinothérapie des dysenteries et des diarrhées bacillaires.*—*Bull. Soc. Méd.-Chirurg. Indochine.* 1915. Oct. Vol. 6. No. 8. pp. 275-277.

This article is a polemic with GAUDUCHEAU dealing with the following points:—the employment of vaccinothérapie in chronic cases of dysentery, the dangers of anaphylaxis to be feared from repeated injections, the value of rectal and gastric ingestion of killed microbes in producing prophylactic and curative immunisation, the precise temperature to be employed for killing the organisms in the preparation of the vaccine so as to avoid the employment of antiseptics, and the variation in different individuals to the reaction resulting from intramuscular injection of antidysenteric vaccine.

F. E. T.

WOODCOCK (H. M.). *Note on the Epidemiology of Dysentery.*—*Jl. Roy. Army Med. Corps.* 1918. Jan. Vol. 30. No. 1. pp. 110-111.

The author discusses the opinion expressed by Carey EVANS that infection is mainly transmitted by flies in bacillary dysentery and by

water in amoebic dysentery. He believes it quite probable that flies do to some extent transmit amoebic cysts but that water, moisture and humidity constitute a far more important factor in the spread of this infection. He also holds the same views respecting the other intestinal protozoal infections.

F. E. T.

LOEHLEIN (M.). *Zur pathologischen Anatomie der Ruhr.* [The Pathological Anatomy of Dysentery.]—*Med. Klinik.* 1918. Jan. 20. Vol. 14. No. 3. pp. 59-61.

Discussing the question of the specificity of the intestinal lesions in dysentery Löhlein concludes that these lesions are not specific in cases of bacillary dysentery, but are much more so in cases of amoebic dysentery without being absolutely specific even in these cases. Thus, in cases of typhoid ulcer amoebae may be present as nosoparasites, so that typical amoebic necrosis may be encountered in typhoid cases.

F. E. T.

ABBATUCCI. *Notes sur un cas de dysenterie spirillaire consécutive à une angine de Vincent.*—*Arch. Méd. et Pharm. Milit.* 1917. Oct. Vol. 68. No. 4. pp. 620-622.

A military wagon driver was admitted to hospital at Fez (Morocco) early on the morning of May 28th, 1917, having been suddenly seized in the middle of the night with violent abdominal pain, vomiting and profuse diarrhoea. The stools were muco-sanguinolent. As Fez is the country *par excellence* for intestinal amoebiasis, the stools were at once examined for amoebae, with negative result. After mid-day the symptoms became cholericiform. A Gram-stained film was therefore prepared from the stools and examined for vibrios. No vibrios were found, but such large numbers of spirilla were discovered as to suggest the diagnosis of spirillary dysentery, first described by LE DANTEC of Bordeaux. The spirilla agreed with those of LE DANTEC in being short, non-spiral, with two or three large undulations, or reduced to a simple crochet or simple interrogation mark, and Gram-negative.

It was then found that the patient had been in hospital a few days previously (from May 16th to 22nd) for Vincent's angina, fusospirillary, which had rapidly healed under applications of galyl. The preparations from the stools were compared with those from the pharyngeal exudate, and appeared identical except that in the former fusiform bacilli were absent.

The symptoms rapidly subsided after two intestinal irrigations of galyl solution, 0.20 cc. to the litre, and the spirochaetes almost vanished from the stools.

Abbatucci believes that the spirochaetes present in his patient's pharyngeal and intestinal lesions were identical and that the same organism had produced at once the pharyngeal syndrome (angina) and the intestinal syndrome (dysentery).

F. E. T.

LUGER (Alfred). **Ueber Spirochäten und fusiforme Bazillen im Darm, mit einem Beitrag zur Frage der Lamblien-enteritis.** [On Spirochaetes and Fusiform Bacilli in the Intestine with a Contribution to the Study of *Lambli*a Enteritis.]—*Wien. Klin. Woch.* 1917. Dec. 27. Vol. 30. No. 52. pp. 1643–1647.

Luger records the case of a soldier aged 43 who was admitted to a field hospital in February 1917, said to be suffering from dysentery. Blood and mucus were found in the thin watery stools, but there was no tenesmus. In the stools were found large numbers of *Lambli*a *intestinalis* both free and encysted, together with spirochaetes and fusiform bacilli. The spirochaetes had flat open spirals and were found singly and in large tangled masses, the *Lambli*a being often surrounded by a thick network of spirochaetes. The fusiform bacilli were also found singly and in masses. No amoebae were found, and repeated bacteriological examinations for dysentery and paratyphoid bacilli were always negative.

Luger considers that *Lambli*a as well as spirochaetes and fusiform bacilli may be found in variable numbers as normal parasites in the human intestine. Under certain conditions, as yet unknown, these organisms may exhibit an abnormal increase in numbers, which indicates an increased severity of any disease process present in the intestine, causing it to be more prolonged and less amenable to treatment. The spirochaetes and fusiform bacilli would appear to be specially concerned in ulcerative processes, such as dysentery and flagellate enteritis. In one case a cat was successfully infected with a human stool rich in spirochaetes and fusiform bacilli.

In pathological multiplication of the intestinal spirochaetes *S. eurygyrata* appears to occupy the first place.

F. E. T.

SANGIORGI (Giuseppe). **Dissenteria da spironeimi.** [Dysentery due to Spirochaetes.]—*Pathologica.* 1918. Jan. 15. Vol. 10. No. 220. pp. 13–14.

A very incomplete account of a case of choleraic diarrhoea, occurring in an adult male, in which microscopic examination of the stools revealed nothing but spirochaetes. The case apparently got well in a week's time. There were no cases resembling cholera at the time in the neighbourhood.

J. B. N.

GEISSLER (Oswald). **Jodtherapie bei Ruhr.** [Iodine Therapy in Dysentery.]—*Münch. Med. Woch.* 1918. Feb. 12. Vol. 65. No. 7. pp. 187–189.

During an epidemic of dysentery in Mannheim, Geissler has obtained good results from the use of tincture of iodine. Two drops were given by the mouth thrice daily and enemata of fifteen drops of ten per cent. tincture of iodine in camomile tea were also administered. A stronger concentration caused an immediate evacuation of the bowels, whilst the fifteen drop concentration usually caused a slight burning sensation in the abdomen. In some cases even this sensation became unpleasant

and then only ten drops were used per litre. Symptoms of iodism sometimes occurred with slight rise of temperature in a few cases, but were never severe.

The effects on the stools were as follows :—Bleeding was arrested in every case, usually after two or three injections, severe cases requiring six or seven. Mucus disappeared after two or more injections, the first injection being usually followed by the passage of a large amount of mucus. After two to six injections watery stools were replaced by formed motions. Abdominal pain and tenesmus diminished.

In three of the severest cases where extensive necrosis of the bowel existed the iodine therapy was without effect and death ensued. Recurrences could also be treated with the same results.

F. E. T.

McCULLOCH (Champe Carter). The Prevention of Dysentery in Army Camps.—*Med. Record*. 1918. Mar. 23. Vol. 93. No. 12. (Whole No. 2472.) pp. 487–491.

The writer points out how dysentery has existed from the earliest times, having often prevailed in epidemic form especially following war and famine, and in jails, asylums, and crowded camps, since it was called by Herodotus the "war plague." SHIGA is quoted to the effect that "always a constant companion of war, it has been more fatal to armies than powder and shot."

In the prevention of dysenteric diseases rational prophylactic measures may be considered under two headings, namely: (1) General sanitary measures and (2) Specific methods. The general sanitary measures include the isolation of patients, the care of the food and water supplies, the disposal of excreta and wastes, including kitchen wastes and general waste of the camps, together with the proper handling of horse manure so as to prevent the breeding of flies.

The specific methods of procedure available differ in the amoebic and bacillary forms of the disease.

In amoebic dysentery the abolition of cysts in the stools would prevent the spread of the disease by carriers. This is best done by giving emetine bismuth iodide in large doses, i.e., not less than 36 to 40 grains in daily doses of three to four grains.

The present status of the question of the specific prophylaxis of bacillary dysentery cannot be said to be entirely satisfactory. The results of the various prophylactic vaccines which have been given are discussed, and in a footnote it is stated that the results obtained by the use of WHITMORE's triple dysentery lipo-vaccine [see p. 20] so far have been quite encouraging both as to lack of toxicity and for immunity response. McCulloch considers that ROUX's heterologous anti-microbial immunity produced by an invisible antagonistic microbe [see d'HERELLE; this *Bulletin*, Vol. 11, p. 262] provides a valuable hint and a hope that the problem may be solved.

F. E. T.

LABBÉ (Marcel). Un cas d'entérite à *Balantidium coli*.—*Paris Méd.* 1917. Dec. 8. Vol. 7. No. 49. pp. 472–473.

A soldier in France became ill in March 1916 with violent abdominal pain, bloody stools containing mucus, but no fever. This continued (C474)

for a fortnight, after which the patient was admitted to hospital. By this time the diarrhoea had subsided but pain remained and diarrhoea returned in two days. Bacteriological examination of the faeces gave negative results. On microscopical investigation *Balantidia* were found in large numbers. Treatment by rectal injection of 1:1000 solution of silver nitrate was given for four days and 10 cgm. doses of calomel for three days. The symptoms disappeared and the patient gained in weight. The possibility of the patient having become infected in hospital was considered but the examination of the water supply and of the faeces of the other patients did not reveal any *Balantidia*. The author suggests that the patient contracted this infection in the trenches. [No information is given as to the patient's occupation or previous history.]

B. Blacklock.

YOUNG (Antonio D.) & WALKER (O. J.). *Balantidium coli* Infection in Oklahoma.—*Jl. Amer. Med. Assoc.* 1918. Feb. 23. Vol. 70. No. 8. pp. 507-508.

Before considering their own case the authors give a short review of previous work. The patient under their charge was a white man of 60 years of age. One year before he was engaged in feeding a small herd of hogs which all died of some unknown disease. The patient was subsequently engaged as a "gut stripper" in a local packing plant and stated "that he was accustomed to stand ankle deep in hog dung, and that every day he was sprinkled with it and frequently got faecal material in his mouth." Eight months before admission dysenteric symptoms began, with frequent bloody stools and tenesmus, and continued up to date of treatment. He had lost in this time 40 pounds in weight. Protoscopic examination was made and the walls of the rectum and lower colon were found covered with bloody mucus beneath which many shallow bleeding ulcers were revealed. *Balantidium coli* was present in scrapings in enormous numbers. Treatment by injection into the bowel of quinine, 15 grs. to the quart of water every four hours at first and gradually decreasing in frequency, caused the disappearance of the organism. The stools became normal. He was discharged and took 3 drops of Lugol's solution thrice daily for two months. Nine months after discharge patient reported again having some abdominal discomfort. The stools were of normal consistency but a few *Balantidia* were found. He had gained 29 pounds in weight. The course of treatment is being repeated. A short description of the parasite is given.

B. B.

MALARIA.

PUNJAB. Report on Malaria in Amritsar, together with a Study of Endemic and Epidemic Malaria and an Account of the Measures Necessary for their Control. By Major Clifford A. GILL [Chief Malaria Medical Officer, Punjab]. (October 1913 to October 1914.)—ii + 98 + vii pp. With 4 maps & 8 charts. 1917. Lahore: Printed by the Superintendent, Government Printing, Punjab. [Price Rs.3.]

This is a most instructive report, not merely as giving a detailed account of a well-conceived malaria survey, but even more as illustrating the many factors that have to be studied and analysed before the general principles of malaria-prevention can be applied hopefully.

The survey was conducted between December 1913 and October 1914: the area included in the survey comprised Amritsar, a walled city with a population of about 140,000 persons, and the civil station, cantonments, and immediate vicinity outside the walls.

The first part of the report deals with topography, hydrography and physiography and all the natural conditions underlying malaria: also with the historic, social, economic, and sanitary conditions that bear upon its incidence; and as a further preliminary the vital statistics for the preceding 44 years have been collected and analysed.

In the second part the local history of malaria is reviewed for 44 years up to and including the period under report, and from this review it appears that malaria in Amritsar has occurred in epidemics of greater or less intensity succeeded by several years of low "fever" mortality, the more intense the epidemic the lower and more prolonged being the subsequent fall. The local statistics of malarial endemy (spleen-censuses made at intervals since 1871, and two parasite-rates determined since 1909) are also analysed. The spleen-statistics show, *inter alia*, that the spleen-rate is lowest in the part of the city occupied by the well-housed and well-to-do classes. The author considers that—quite apart from greater practical difficulty and greater liability to personal error in attainment—the parasite-rate of Amritsar is of less value than the spleen-rate as a standard.

The Anopheles mosquitoes and their seasonal prevalence and breeding places are next considered. The commonest species is *A. rossii*, and four species whose rôle is established occur, namely, *A. culicifacies*, *A. listoni*, *A. fuliginosus*, and *A. stephensi*. Of these *A. fuliginosus* was found throughout the year. Apart from temporary collections of rain water and puddles from spill-water, the usual permanent breeding places were "dhabs" (ponds with shallow grassy and weedy edges), storm-water channels, and irrigation channels after the flow of water has been cut off. Well-filled "tanks" (reservoirs with masonry walls) used for washing, and shallow-wells in constant use did not harbour larvae to any extent.

In the third part of the report the precedent causes of malaria in Amritsar are very fully discussed. As regards epidemic malaria the author appears satisfied from statistical evidence that an epidemic confers a degree of "immunity" upon the community—an "immunity" roughly proportionate to the severity of the epidemic. This "immunity," or resistance to infection, is impaired by privation;

so that if after a period of scarcity and high prices there should occur a heavy monsoon rainfall—particularly during the months of July and August—another epidemic will immediately follow. In emphasising the influence of the economic factor the author is in agreement with CHRISTOPHERS. In respect also of endemic malaria the author thinks that economic conditions play an important part.

As regards canal irrigation, in the city of Amritsar, where the water is used chiefly for jungle gardens, irrigation undoubtedly favours the conditions for endemic malaria, but it is not yet demonstrated whether or not canals have this effect in the open country where the water is used for field crops.

The fourth part of the report deals with the prevention of malaria. Here although the author discusses with much discernment the local application of all well established measures (drainage, control of irrigation, water supply, treatment of breeding places, screening, quinine treatment, etc.) he very properly emphasises the importance of general sanitation and of all measures that promote the well-being of the people and their powers of resistance to disease as being an important part of anti-malarial policy. The disappearance of malaria from Great Britain might surely be regarded as an endorsement of the author's views on this point.

A. Alcock.

BARBER (Marshall A.). **Some Observations and Experiments on Malayan Anopheles with Special Reference to the Transmission of Malaria.**—*Philippine Jl. Sci.* Sec. B, Trop. Med. 1918. Jan. Vol. 13. No. 1. pp. 1–46. With 2 figs.

A report full of interesting detail, and containing some useful technical tips.

The following species were found by laboratory experiment to be susceptible to infection up to the oocyst stage :—*Anopheles ludlowi*, *A. rossi*, *A. rossi* var. *indefinitus*, *A. kochi*, *A. aconitus*, *A. fuliginosus*, *A. maculatus*, *A. karwari*, *A. umbrosus*, *A. hunteri*, *A. barbirostris*, *A. sinensis*.

In the case of *A. rossi* var. *indefinitus* numerous dissections (many with evidence of oocysts) failed to show in any instance any infection of the salivary glands ten days after the infective feed : and the same unsuccessful result occurred with 2 dissections of *A. fuliginosus* (in one of which the mid-gut was infected), and with 6 dissections of *A. sinensis*. In the case of *A. kochi*, *A. maculatus*, and *A. hunteri* developments later than the oocyst stage were not investigated. A single laboratory experiment with *A. aitkeni* was negative.

With regard to *A. rossi* "type Giles" the author satisfied himself by experiment that the infection can be actually transmitted to man. [This may have some bearing upon the statement (see this *Bulletin*, Vol. 11, p. 280) that at Khewra in the Jhelum District of the Punjab where the spleen-index is 64·6 the only species of *Anopheles* known is *A. rossi*.]

Wild specimens of all the species mentioned above, except *A. aitkeni*, as well as specimens of *A. tessellatus* were examined, and a small proportion of the following 3 species only was found naturally infected :—*A. ludlowi* 18 dissected ; 1 infection of mid-gut, 1 infection of salivary

glands. *A. umbrosus* 261 dissected; 1 infection of mid-gut, 6 infections of salivary glands with abnormally thick sporozoites. *A. maculatus* 11 dissected; 1 infection of mid-gut.

Not any one of 200 wild *A. rossi*, of 66 *A. aconitus*, of 60 *A. karwari*, of 22 *A. sinensis*, of 14 *A. barbirostris*, of 6 *A. kochi*, of 4 *A. fuliginosus*, of 3 *A. tessellatus*, and 2 *hunteri* was found naturally infected.

A. A.

DELANGE. Quelques considérations sur le paludisme à Ha-giang.—*Bull. Soc. Méd.-Chirurg. Indochine*. 1915. Dec. Vol. 6. No. 10. pp. 422-428.

The author discusses the notorious insalubrity of Ha-giang in the province of Tong-king, due almost entirely to malaria. Europeans and natives are equally vulnerable. The percentage of subtertian infections is among Europeans 83·3, and in natives 90. But notwithstanding this high percentage of subtertian, pernicious forms of the disease are rare; the usual result is anaemia accompanied only very rarely with enlargement of the spleen.

A. A.

NETTER (Louis) & GUILHEM (Joseph). Remarques sur le paludisme au Maroc.—*Arch. Méd. et Pharm. Milit.* 1917. Dec. Vol. 68. No 6. pp. 911-930.

According to the authors malaria in Morocco is remarkable for its comparatively benign character, notwithstanding that infection with *P. praecox* [= *falciparum*] is quite common: in their 209 cases studied at Marrakech between 1st June and 15 November only 3 malignant forms of the disease occurred, these all being of the comatose type.

The memoir contains many interesting observations and intelligent criticisms but nothing very novel.

A. A.

ROUSSEAU (L.). Recherches sur l'endémie paludéenne à Douala (Cameroun) en 1917.—*Bull. Soc. Path. Exot.* 1918. Apr. Vol. 11. No. 4. pp. 286-291.

Natural conditions at Duala (Cameroons) are very favourable to *Anopheles* mosquitoes in the rainy season. A common species is *A. funestus*. The malaria index may be inferred to be high, though only 297 individuals in a population of 10,000 were examined. The parasite-index was 71·5 in children up to five years, 50 between five and ten years, 47 in adolescents, and 42 in adults; and the corresponding spleen-indices were 51·8, 29, 26, and 4. The malaria parasites observed were *P. falciparum* and *P. vivax*.

A. A.

LEGER (Marcel). Documents hématologiques relatifs au Paludisme à la Guyane Française.—*Bull. Soc. Path. Exot.* 1918. Feb. Vol. 11. No. 2. pp. 67-73.

In this paper from the Cayenne Institute of Hygiene the local specific incidence of malarial fevers for three years, 1915-1917, is

tabulated with comments. The material for the statistics was obtained from the Colonial Hospital and the Civil Hospital of Cayenne, and includes only positive blood-examinations.

The statistics show that in French Guiana malarial fevers occur continuously throughout the year—there is no well-defined off season.

Of benign tertian the percentage of cases is 42·6 for the period December-March, 34·2 April-July, 33·9 August-November. Of malignant tertian the percentage of cases is 52·9 for the period December to March, 62·1 April-July, 62·8 August-December. Of quartan the percentage of cases is 4·4 for the period December to March, 3·6 April-July, 2·9 August-December.

In 61 children examined, *P. vivax* was found in 68 per cent. and *P. praecox* [= *falciparum*] in 28 per cent. ; whereas in 539 adults the percentage of *P. vivax* was 36·7, and of *P. praecox* 59·7.

A. A.

REGENDANZ (P.). *Beitrag zur Kenntnis der Malaria in Rumänien.*—*Arch. f. Schiff- u. Trop.-Hyg.* 1918. Feb. Vol. 22. No. 3. pp. 33-40. With 1 chart.

In view of the probable outbreak in 1917 of malaria in the German army in Roumania investigations were made in the villages in the region of the lower Sereth river early in the year. Of several hundred children under ten whose blood was examined by the thick film method in April and May only 1-2 per cent. were found to carry parasites, and the same percentage was found in a smaller number of cases in October, benign tertian in all instances. *A. maculipennis* was the Anopheline ; it was not plentiful. The day and night temperatures for May-November are tabulated and it is calculated that the temperature did not become high enough for the development of the parasite in the mosquito till the end of June ; the mean was then 22·4° C. Cases occurred among the troops between April and July and the question arose whether these were due to mosquito bites or relapse of latent infections : it was answered by the fact that there were cases in a regiment which had suffered from malaria in Russia in the previous year, and none in a regiment which had come from France and had not. A chart shows graphically the malarial attacks, tertian and subtertian, and the temperatures between May and October.

A. G. B.

ROUBAUD (E.). *Disparition du pouvoir infectant chez l'Anophèle paludéen, au cours de l'hibernation.*—*C. R. Acad. Sci.* 1918. Feb. 11. Vol. 166. No. 6. pp. 264-266.

The author describes his experiments with *Anopheles maculipennis* infected with *Plasmodium praecox* [= *falciparum*]. On the 30th August five clean-bred specimens were fed on a human carrier ; three of them, examined 7-12 days afterwards, were found heavily infected with sporocysts ; in a fourth, examined on the 25th day, the salivary glands were crammed with sporozoites ; the fifth was kept in a laboratory where the max. temperature reached 24° C. and the min. 4° C., being fed on syrup for 2½ months, and then allowed to bite various animals on four occasions during the next 23 days. When,

on the 106th day after the original infective feed, this fifth specimen was allowed to bite the author it did not infect him; and when, 4 months and 5 days after the original feed, it was killed, a few degenerate sporozoites were found in one salivary gland only.

The author concludes that an infected *Anopheles* must purge itself of sporozoites in the course of a few bites, and that any sporozoites not so discharged gradually degenerate.

MITZMAIN having established the fact [see this *Bulletin*, Vol. 11, p. 32] that in a temperate climate an *Anopheles* does not develop a malarial infection in winter, the author considers that his own experiment shows that an *Anopheles* infected in the summer does not hibernate the infection

A. A.

LAGRIFFOUL (A.) & PICARD (F.). *Mode d'action du climat sur la répartition géographique du paludisme.*—*Bull. Soc. Path. Exot.* 1918. Feb. Vol. 11. No. 2. pp. 73-80.

A purely ratiocinative paper. Accepting it as a postulate that for exogenous development in the mosquito *Plasmodium praecox* [= *falciparum*] requires, as compared with *P. vivax*, a higher atmospheric temperature, the authors conclude that the geographical limitation of *P. praecox* is directly determined by climate an explanation of *ignotum per ignotius*.

In the subsequent discussion Prof. ROUBAUD stated as facts of personal observation that in *Anopheles maculipennis* the development of *P. praecox* goes on as readily at ordinary laboratory temperatures (14°-23° C.) as in the incubator (25°-28° C.); but that, given the same temperatures, *P. vivax* develops more rapidly than *P. praecox*. ROUBAUD's inference therefore is that although so far as mere temperature goes the conditions are not unfavourable to the existence of *P. praecox* in France, yet that the precocious development of *P. vivax* in the mosquito is, within the seasonal limits of the French climate, antagonistic to *P. praecox*. In fact, it would seem according to ROUBAUD that, taking the entire developmental cycles of the two species into consideration, *P. vivax* has been "naturally selected" in temperate latitudes owing to its more rapid development in the mosquito.

A. A.

- i. BERNARD (A.). *Deux cas de paludisme autochtone. Essai de stérilisation par le novarsénobenzol à doses croissantes.*—*Progrès Méd.* 1917. Dec. 8. No. 49. pp. 429-431. With 2 charts.
- ii. TRÉMOLIÈRES (F.) & FAROY (G.). *Quatre cas de paludisme autochtone.*—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1918. Jan. 24. 3 Ser. Vol. 34. No. 1-2. pp. 22-27.
- iii. RAVAUT (Paul). *Comment peut se développer en France un foyer de paludisme autochtone.*—*Paris Méd.* 1918. Mar. 23. Vol. 8. No. 12. pp. 232-234.
- iv. TAPIE (J.). *Paludisme autochtone : deux nouveaux cas observés en Champagne.*—*Progrès Méd.* 1918. Jan. 5. No. 1. pp. 3-5. With 1 chart.

i. Two more cases of "autochthonous" malaria, the infection in both being benign tertian. Novarsenobenzol was employed in

treatment, beginning with an injection of 30 cgm. increased, by gradual augmentation of 15 cgm. in each of four successive injections, to 90 cgm.

ii. Abstracts of four cases—3 benign tertian, and 1 determined by culture according to BASS's method to be subtertian—in patients who had never been abroad but had been stationed in marshy districts (S. Alsace and Haut-Rhin) in propinquity to colonial contingents.

iii. Another instance of home-engendered malaria, the local *Anopheles* having become infected by malaria-carrying immigrants from abroad. The little epidemic occurred near Vidaubon in the South of France, and the infection—benign tertian—was traceable to a body of strangers which included Greeks, Spaniards, and Annamites.

iv. Two more cases of malaria in men who had never been out of France but had been in contact with troops returned from abroad and were aware of having been bitten by mosquitoes.

A. A

CAILLE (E.). *Cas de paludisme autochtone rennais à Plasmodium falciparum décelé par une injection de néosalvarsan.*—*Bull. Soc. Path. Exot.* 1918. Apr. Vol. 11. No. 4. pp. 282-286. With 1 chart.

An interesting case of subtertian malaria in a woman 32 years of age who had lived in Rennes all her life except the first 3 months of 1917 when she lived near a marsh outside that town known to be haunted by *Anopheles maculipennis*. Being apparently an unfortunate female, and happening to be brought to hospital for a vaginal complaint, she was found to have a positive Bordet-Wassermann reaction and was treated with injections of neosalvarsan. After the fourth injection she had a febrile attack, which in course of time showed such an obvious temperature-curve that remittent malarial fever was suspected. Ultimately ring forms of *P. falciparum* were discovered in the blood, and the patient responded favourably to quinine treatment. The author has no doubt that this is a case of a latent subtertian infection—obviously indigenous—awakened by neosalvarsan.

A. A.

DIETERLEN (F.). *Malariainfektion an der Westfront.*—*Deut. Med. Woch.* 1918. Mar. 21. Vol. 44. No. 12. pp. 316-317.

The author, who has been unable to learn of any malaria acquired on the German side of the Western Front, describes the cases of two soldiers who had attacks in September 1917 in the Vosges district, tertian parasites being identified. *Anopheles* were caught in a cellar hard by. All the officers and men of the Division who had ever suffered from malaria were examined but no carriers were found, and the author is disposed to assign as the source Senegalese troops who were opposed in that sector and district at from 50 to 800 metres distance. No more cases occurred.

A. G. B.

SMITH (Morgan). *Malaria in Infants.*—*Southern Med. J.* 1918. Mar. Vol. 11. No. 3. pp. 213-214.

The author remarks that among common features of malarial fever in infants are vomiting, diarrhoea, stuporous sleep, and absent or

inappreciable sweating stage. In his opinion many cases attributable to hookworm are malarial: on the other hand pyelitis in infants often simulates malaria.

Among other points emphasised in a copious discussion of the paper were the infrequency of splenic enlargement in the acute malaria of infants, the importance of routine examination of blood, and the tolerance of quinine. One speaker having a large experience advocated a quinine dosage proportionate to the severity of the attack, irrespective of the age of the patient, and stated that he had given as much as 30 grains at one dose to a child.

A. A.

DEGLOS & CHASPOUL. Quelques remarques à propos de la présence de croissants chez les paludéens.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1917. Dec. 31. 3 Ser. Vol. 33. No. 35-36-37. pp. 1268-1271.

The authors, at Grenoble, have since November 1916 been conducting systematic blood-examinations of malaria patients. They have found that whereas from the beginning of September to the beginning of November the percentage of cases carrying crescents was 22·6, the percentage from November to the following September was only 2·6.

The authors do not consider themselves justified in discussing the bearing of these observations on the unity theory, on account of the possibility of mixed infections; they rather propose a theory of their own. Assuming that crescents are cysts, they suggest that the cysts may be so susceptible to atmospheric changes as to disappear gradually in the cold weather, and to reappear gradually during the summer up to a maximum in the autumn—a verbal explanation which merely restates the facts.

A. A.

PORAK (René). Des poussées de splénomégalie simple au début du paludisme.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1917. Dec. 31. 3 Ser. Vol. 33. No. 35-36-37. pp. 1276-1279.

The author draws attention to splenomegaly as an initial symptom of, and defensive reaction to, recent malarial infection—not to be confused with the splenomegaly of chronic malaria. In this simple early splenomegaly (apart from evidence to be obtained from examination of the blood) the symptoms do not particularly suggest malarial infection. The symptoms, directly due to distension of the spleen, are splenic pain and tenderness, cough, and intestinal spasm: along with these there is dyspnoea, digestive trouble, asthenia, pallor, headache, and lumbar and muscular pain. The temperature fluctuates between 36° and 38° C. (96·8 and 100·4° F.). It is suggested that the aetiology may be prophylactic quinine impeding the development of the malaria parasites; not latent or masked malaria, which are not signalled by the characteristic cough, local pain, and intestinal spasm of this simple splenomegaly.

A. A.

NEUSCHLOSZ (S.). **Ueber die künstliche Ausschwemmung der Malaria-parasiten ins Blut.** [Flushing of Latent Malaria Parasites into the Blood.]-*Münch. Med. Woch.* 1918. Jan. 22. Vol. 65. No. 4. pp. 98-99.

Acting on the assumption that latent parasites lie up in the spleen and can be driven out by substances which act on constrictors and vaso-constrictors of the smooth muscles the author gave the active constituents of ergot, the suprarenals, and hypophysis to the subjects of latent malaria and induced a transient outpouring of parasites into the blood. Adrenalin acts most swiftly and ergot irregularly. The result was positive in about 90 of 100 trials, 4 to 6 hours after administration. The attacks are not typical and may or may not be accompanied by rise of temperature, and fever may occur when the parasites have disappeared. Later it was noted that when the result was positive parasites could be detected in the spleen pulp, and when negative, not.

A. G. B.

FORSCHBACH & PYSZKOWSKI (G.). **Mischinfektionen mit Tropika und Tertiana?**-*Deut. Med. Woch.* 1918. Feb. 28. Vol. 44. No. 9. pp. 238-239. With 4 figs. & 4 curves.

Of seven cases of chronic subtertian malaria, from Macedonia, under the authors' observation at Breslau from the late autumn of 1916, in three there was a change in type of parasite in the summer of 1917. Details are given with illustrations. In each case small rings and crescents were at first present and persisted through part or all of the winter, then disappeared, to be replaced later by benign tertian parasites—in May (2 cases), beginning of July (one). In two of the cases the bouts of fever became more frequent and the cold fits more severe. The three possible explanations are, (1) super-infection with benign tertian at Breslau, which may be excluded; (2) double infection; (3) conversion of subtertian parasites into tertian. The last two are discussed with references to observations of TEICHMANN [this *Bulletin*, Vol. 11, p. 21] and ARMAND-DELILLE [*loc. cit.*, p. 11]. [The paper by VON HEINRICH (*loc. cit.*, p. 284) should also be consulted].

A. G. B.

BRUENN (W.). **Erfahrungen bei Malaria.**-*Deut. Med. Woch.* 1918 Mar. 14. Vol. 44. No. 11. pp. 290-291.

With reference to a previous paper [see this *Bulletin*, Vol. 10, p. 176] on accelerated schizogony in tertian malaria, the author says that this is a very frequent phenomenon. In the epidemic with which he is now concerned [locality not stated] though the blood was examined early, gametes were regularly found as well as the forms already described. This he attributes to quinine prophylaxis, which has not prevented the development of parasites but has delayed the onset of fever. After some theorising on the retrogressive metamorphosis [*Rückbildung*] of gametes the author recommends that patients be treated in two categories: the prophylactics (regular quinine takers)

by NOCHT's small dose method, the non-prophylactics by a dose of 1.5 gm. 4-6 hours before the expected attack and continued for some days, with intent to forestall gamete formation and cut the disease short.

A. G. B.

KAYSER-PETERSEN (J. E.). **Zur Klinik der chronischen Malaria.**—*Münch. Med. Woch.* 1918. Feb. 19. Vol. 65. No. 8. pp. 207-208.

This is chiefly a plea for the systematic observation and treatment of Germans who have suffered from malaria in the war as well as for the repression of Anopheles in Germany. Incidentally we are told that in the first year of war 0.17 per mille of the troops applied for treatment and in the second year 0.8 per mille. The author, who is a surgeon with the Bulgarian fleet, says that there is much malaria among the crews. He draws attention to the fact that an ephemeral fever may be due to chronic malaria. This was so in 5 cases among 70 which he had under observation; after two months, without quinine, there had been no second rise of temperature. He saw 5 cases in which the intervals between accesses of fever were 4, 5, and 6 days. In ephemeral as well as in five day fever therefore, the blood must be searched for malarial parasites. He goes on to indicate clinical signs by which malaria may be recognized when the blood is negative, and here it is not profitable to follow him. No mention is made of the type of parasite.

A. G. B.

LOEWY (Julius). **Einige Beiträge zur Symptomatologie der Malaria.**—*Med. Klinik.* 1918. Mar. 24. Vol. 14. No. 12. pp. 287-289. With 8 charts.

The author, who is in charge of a hospital at Belgrade, gives notes of two cases admitted with suspicion of enteric fever, in whom benign tertian parasites were found; a continued fever in each case fell on the fifth day. To illustrate the difficulties of diagnosis he reproduces the charts of two cases of abortive typhoid, which are very like those of the malarics. This form is quite common in Serbia and is not due to inoculation because most of the cases had not been inoculated. He gives also charts showing the influence of malaria and enteric, when coincident, upon one other. He refers with approval to the method of inducing relapses by injection of milk. To seven patients who had remained for 4 weeks without symptoms after a Nocht's course of quinine he injected intravenously 5 cc. of a 10 per cent. solution of salt. In two cases of tertian typical attacks were induced with parasites in the blood, showing how easily relapses can be produced.

A. G. B.

ENGEL (C. S.). **Weist basophile Punktierung in den roten Blutkörperchen auf Malaria hin?** [Is Basophile Stippling in the Red Corpuscles an Indication of Malaria?].—*Deut. Med. Woch.* 1918. Apr. 11. Vol. 44. No. 15. pp. 404-406.

Whereas SCHILLING, following PLEHN, states that basophile stippling of the red corpuscles points to malaria, the author is unable

to confirm this. His observations were made on the Russian front, SCHILLING's in Turkey. Engel found stippling in about 25 per cent. of 115 preparations of blood from malarial patients, but with no relation to the number and stage of development of the parasites, and pointing neither to relapses nor to action of quinine. He suggests that the climate in which the Anopheline host lives may influence the morphological and toxic properties of the tertian parasite.

A. G. B.

FALCONER (A. W.) & ANDERSON (A. G.). Clinical Types of Subtertian Malaria, as seen in Salonika in September, October, and November, 1916.—*Jl. Roy. Army Med. Corps.* 1918. Feb. Vol. 30. No. 2. pp. 215-226. With 2 charts.

The authors deal with over 3,600 authentic cases of malaria seen during September-November, the percentage of subtertian being very high. The majority of the subtertian cases were uncomplicated and responded well to quinine. Complicated subtertian cases could be separated into the following types:—(a) *Dysenteric*: a common type, where the dominant symptom was faeculent diarrhoea occasionally with blood; in two fatal cases submucous haemorrhages were found in the large intestine; in a few cases only, where the diarrhoea persisted, flagellates and *Balantidium* were also observed. (b) *Choleraic Pernicious Fever*: two cases only, both quickly fatal; post mortem the spleen was enlarged and almost diffuent, and the colon and sigmoid flexure were congested. (c) *Appendicular*: 12 cases, suggesting appendicitis, the predominant symptoms being vomiting and severe pain in the right iliac fossa. (d) *Bilious Remittent Fever*: admitted in a state of collapse, with jaundiced conjunctivae and "a peculiar earthy facies"; vomiting constant, sometimes uncontrollable hiccough, bilious diarrhoea; 13, being 50 per cent. of the fatal cases of malaria, were of this type; post mortem the chief features were enlarged spleen, submucous haemorrhages in various organs, and a gall-bladder distended with thick dark bile. (e) *Pernicious Fever with Pulmonary Symptoms*, sometimes bronchitic, sometimes pneumonic and broncho-pneumonic, 7 of the 26 fatal cases of malaria being of the latter type. The authors endorse the opinion that there is a definite clinical type of pneumonic malaria unmixed with any other infection. (f) *Cerebral*, 9 cases of divers type—delirious, prolonged coma, bulbar, epileptiform—were observed; only one case, where meningitic symptoms were complicated with ordinary croupous pneumonia, was fatal. (g) *Generalised Oedema with Ascites*: two cases, with normal urine, no enlargement of liver, and no evidence of heart or kidney disease. (h) *Gangrene of the Feet*: three cases, all of which recovered, one of them without loss of tissue.

For uncomplicated malaria the authors record a mortality of 0.47 per cent.

A. A.

PEPPER (O. H. Perry). Report of Certain Unusual Cases of Malaria, with a Brief Analysis of 50 Cases of this Disease.—*Amer. Jl. Med. Sci.* 1918. Jan. Vol. 153. No. 1. (No. 550). pp. 70-78.

This paper contains, *inter alia*, abstracts of 5 cases of malaria in which the symptoms were misleading. In two the symptoms were

cerebro-spinal; in one until crescents were discovered, the diagnosis of septicaemia, after excluding typhoid, seemed justified by blood-cultures; in another the diagnosis was frustrated by concomitant lead-poisoning; and another had been admitted to hospital with a diagnosis of pernicious anaemia.

A. A.

MONIER-VINARD (R.). Troubles physiopathiques médullaires dans le paludisme.—*Rev. Neurologique*. 1917. Aug.-Sept. Vol. 24. No. 8-9. pp. 66-76.

The author has dealt with 64 neuropathic cases of malarial origin in most of which parasites were demonstrated. He arranges them in the following series:—(1) Painful muscular cramp, usually limited to a single muscle or group of muscles, but in one case affecting almost all the muscles of the body. (2) Hypertonic muscular rigidity, commonly of all the limbs, and sometimes lasting for 2 or 3 months. (3) Motor asthenia, sometimes so extensive that the patient can hardly move and is quite unable to stand upright. (4) A combination of the foregoing. (5) Sensations of cold and creepiness in the extremities. (6) Anaesthesias of various kinds. (7) Vasomotor and local circulatory disturbances and their sequelae. In all the patients observed electrical reactions were more or less abnormal.

All these neuropathic perturbations are to be regarded as of the nature of reflex paralysis probably due to functional derangement of the central nervous system. This functional disturbance is not directly due to the malaria parasites, and is not controlled by quinine, but resembles in a general way the disturbances caused by other specific infections and toxins.

A. A.

BROSIOUS (Otto T.). A Report of an Unusual Case of Cerebral Malaria.—*Proc. Med. Assoc. Isthmian Canal Zone*. 1916. July to Dec. Vol. 9. Pt. 2. pp. 61-63.

One peculiarly interesting feature of the case is its concurrence with an epidemic of anterior polio-myelitis.

The patient, a girl of 11 years, exhibited along with a febrile temperature the following symptoms:—Supine semiconsciousness, with the head retracted, the neck rigid, and the eyes rolling upwards; the right arm and leg in a state of flaccid paralysis; no knee-reflex on either side; Kernig sign on the left side.

After a careful physical examination, a blood smear was made and revealed both benign tertian rings and subtertian crescents; and a lumbar puncture was made with a negative result for micro-organisms.

The case responded to quinine, and on the 4th day of treatment she had practically regained her normal state.

A. A.

DE BRUN (H.). Note sur le tremblement paludéen.—*Bull. Acad. de Méd.* 1918. Mar. 26. 3 Ser. Vol. 79. Year 82. No. 12. pp. 269-275. With 1 fig.

According to the author malarial tremor is extremely frequent in chronic cases. It usually affects the limbs only, and the upper much

more often than the lower. It is exceptional for the head to be involved, but the tongue may be affected, and nystagmus has been noticed. The tremors are exaggerated by efforts demanding a nice precision and concentration, so that shaving, writing, painting, etc. may become impossible; also they are intensified by fatigue and by emotion. It is not rare, in cases of long duration, for crises to occur; such crises may be sudden and unaccountable, and may last for several weeks.

The author in his investigations has excluded all other possible intoxications.

A. A.

FERNÁNDEZ SANZ (E.). *Ataxia aguda paludica*. [Acute Malarial Ataxy].—*Siglo Med.* 1917. Aug. 11. Vol. 64. No. 3322. pp. 586-588.

Report of a case of subtertian malaria treated with quinine, in which at the end of two months the symptoms pointed to an independent affection of the cerebro-spinal tract, so far that an exhaustive examination had to be made before the latter diagnosis could be excluded. After energetic treatment with quinine for a further term of two months, along with cacodylate of soda and, afterwards, lipiodol, the symptoms, chiefly consisting of ataxia and impairment of speech, practically disappeared.

J. B. Nias.

LÉRI (André). *L'hémiplégie paludéenne*.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1918. Mar. 7. 3 Ser. Vol. 34. No. 7-8. pp. 210-215.

By malarial hemiplegia the author means not the transitory toxic hemiplegia that may occur in the course of a febrile paroxysm but lasting hemiplegia due to a cerebral lesion; and he here gives abstracts of five such cases where the only possible cause of the hemiplegia was malarial infection.

Such malarial hemiplegia may occur at any stage of the infection, either acute or chronic. Its characteristic features are gradual onset, incomplete and unequal paralysis, and a more or less regressive course.

The author traces three of his cases to malarial aortitis, and therefore infers embolism in those cases; in the other two cases he suggests cerebral arteritis and a local thrombosis.

None of the patients was advanced in age, the oldest was 48, the others ranged from 21 to 27 years.

A. A.

CHARTRES. *Un cas de paraplégie palustre rapidement guérie*.—*Bull. Soc. Méd.-Chirurg. Indochine*. 1916. Mar. Vol. 7. No. 3. p. 102.

A case of complete paraplegia, without any impairment of power of micturition or defaecation, in a young native cook with a history of frequent attacks of fever. A cure was effected in 15 days by injections of quinine.

A. A.

SAPORTE. Notes cliniques sur un cas de "polynévrite palustre" observé à Hagiang.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1916. Dec. Vol. 7. No. 10. pp. 401-403. With 1 chart.

The patient—a soldier enlisted for the term of the war—had no record of any illness until he was attacked by fever in the second year of service.

On admission his temperature was febrile, there was intense headache, he could not stand without support, had little command of his arms, and could not articulate or control his saliva; but all the reflexes were normal and his intelligence was not affected.

Treated with intramuscular injections of quinine, and with caco-dylate of soda and cinchona he made a complete recovery.

A. A.

GARIN (Ch.) & COUILLARD-DESCOS. L'herpès critique chez les paludéens.—*Progrès Méd.* 1917. July 14. 3Ser. Vol. 32. No. 28. p. 236.

The authors have observed 246 cases of malarial fever, and in 50 per cent. of them have noticed, generally at the stage of defervescence, a herpetic eruption. They have remarked, in the affected patients, its constant recurrence with each febrile paroxysm; and also, in the individual patient, its constant revival at exactly the same spot, be it lip, tongue, conjunctiva, face, scrotum, etc.

Further, they have noticed instances of the herpetic eruption appearing without any febrile symptoms on the day when an attack of fever was due.

A. A.

DELANGE. Un cas de fièvre palustre compliqué d'ictère grave.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1915. Nov. Vol. 6. No. 9. pp. 409-415. With 1 chart.

A case of rapidly fatal jaundice in a young soldier whose antecedents contained no record of anything but attacks of malarial fever. Examination of the blood shortly after admission showed a heavy infection of young forms of *P. falciparum*, along with numerous crescents; great decrease in the number of red cells, and increase in the number of leucocytes. The liver and spleen were enlarged. Anuria and profuse haemorrhage from the bowel preceded the fatal ending, and the globular resistance was greatly diminished.

The autopsy revealed, *inter alia*, an enlarged and almost diffuent liver, pale and friable kidneys, a small intestine full of sanguineous fluid and clots, and a much congested mucosa in the large intestine.

A. A.

PAOLETTI (Ferdinando). Di una rara forma di successione morbosa dell' infezione malarica. [A Rare Sequela of Malarial Infection.]—*Polidlinico. Sez. Prat.* 1918. Apr. 21. Vol. 25. No. 16. pp. 373-374.

The case of a soldier who came into hospital suffering from malaria, *Plasmodium vivax* was demonstrated in the blood. Three days after the commencement of the illness severe oedema of the legs and genitals

set in. As the liver was only slightly enlarged, the circulatory organs sound, and the urine free from albumen, while the general state of the patient was satisfactory, the cause of the oedema was obscure. After a month in hospital on tonic treatment, the symptoms subsided. The condition is ascribed by the author, in the absence of any other indication, to excessive lymphatic exudation of vaso-motor origin.

J. B. N.

- i. LOEWENSTEIN (E.) & NEUSCHLOSS (S.). **Untersuchungen über die Chininausscheidung im menschlichen Harn.** [The Excretion of Quinine in Human Urine.]-*Ztschr. f. Hyg. u. Infektionskr.* 1917. Nov. 5. Vol. 84. No. 2. pp. 257-278. With 9 charts.
- ii. LOEWENSTEIN (E.) & KOSIAN (W.). **Experimentelle Untersuchungen über die Chininausscheidung im Harn. II. Mitteilung.**-*Ibid.* pp. 325-335.

1. The object of the authors was to ascertain what method of administration of quinine led to the highest concentration of the drug in the blood, without risk to the patient, and to maintain such a concentration as long as possible. In the absence, in the field, of facilities for estimating the quinine in the blood the tests were applied to the urine, practically the sole channel of excretion. The test used was potassium mercury iodide, a colour reaction which has recently been criticised, by GIEMSA and others, as untrustworthy for quantitative work [see this *Bulletin*, Vol. 11, p. 299]. Considerable numbers of patients were employed. The results of the tests are given in detail in tables, the intensity of the urine reaction being indicated by the numerals 1 to 5, and as averages in a series of charts. The authors find that with normal persons the excretion of quinine after a dose of 0.5 gm. is virtually over in 12 hours, the maximum varying in time with the method of administration. In patients previously treated parenterally (at least ten injections) the quinine excretion is substantially smaller, whether the test administration is by the needle or by mouth, than in patients not previously treated; the quantity excreted is least in the case of the intravenous and subcutaneous methods and greatest in internal administration. The quinine excretion in patients previously treated internally is, compared with the normal, somewhat delayed but in the total not diminished. That is to say, quinine habituation follows parenteral but not internal treatment.

ii. In this work the above results were tested quantitatively by alkalisating the urine, shaking with ether, and weighing the ether residue. To obtain the whole quantity of urine, rabbits and guinea-pigs were used, it having been ascertained that in their case as in that of man in the course of parenteral quinine administration the quantity of alkaloid excreted in the urine gets less and less. The rabbits usually died however after the 10th or 12th injection. The protocols are given in tabular form. The results confirm those obtained in man. When the phenomenon is analysed it is seen that in parenteral exhibition quinine has a double action: one which takes effect after 24 hours, reaches a slight grade, and quickly dies away, being no longer demonstrable after three days; and one which influences the organism in respect of its behaviour to quinine for several months. This appears

first after about 20 days and is much stronger than the other, much less quinine being excreted in the urine. The authors think that this fall in quinine excretion is attributable to a rise in destructive power on the part of the parenterally treated organism. The organism acquires this property according to the laws of action of true antigens. It only comes into play after parenteral, not after internal quinine, and not before 20 days. It appears to last for six months. The work is being continued.

A. G. B.

BAUR (Jean) & REVELLET. *Note sur la recherche quantitative clinique de la quinine dans les urines.*—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1918. Feb. 7. 3 Ser. Vol. 34. No. 3-4. pp. 119-123.

Picric acid, the authors state, added to very dilute solutions of alkaloids, especially quinine, forms precipitates which are tenuous, light, and very long in settling, giving an opalescent or cloudy appearance. These solutions must not contain albumin, alkaloids other than quinine, or any large amount of salts of potash or uric acid. The quantity of quinine is gauged by comparing the tested urine with a series of sample tubes. About 1/10 of the quinine injected was found in the urine, as tested by this method.

A. G. B.

PORAK (René). *Sur l'élimination de la quinine par les urines. Application au traitement du paludisme.*—*C.R. Soc. Biol.* 1918. Feb. 9. Vol. 81. No. 3. pp. 135-138.

The author during 15 months has systematically examined the urine of patients taking quinine bihydrochloride and quinine urethane. He finds that normally a single dose is eliminated in three stages—an initial stage and a terminal stage, in both of which only traces are found in the urine, and between these a short stage when it is eliminated massively. This stage of "massive" elimination occurs usually from the 4th to the 10th hour after "absorption." But in the dyspepsia of chronic malaria, as well as in malaria complicating serious renal disease and ill-compensated heart disease, quinine is eliminated in the urine only in traces. Also in certain cases of malarial anaemia and cachexia there is a remarkable diminution in the amount of quinine eliminated in the urine.

The author's practical conclusions for ordinary cases are that the maximum dose of quinine should be from 1.5 to 2 grammes, which should be distributed in fractional doses of 0.25 grammes much diluted; that the drug should be continued for several months but with intermissions; and that the best mode of administration is by the mouth.

A. A.

MURRAY (J. H.). *Intramuscular Injections of Quinine.* [Correspondence.]—*Indian Med. Gaz.* 1918. Mar. Vol. 53. No. 3. p. 115.

The writer states that at Port Blair in the Andaman convict settlement the intramuscular method of administering quinine has been

practised extensively for many years with excellent results. During the last 12 months about 4,000 such injections have been given, the usual dose being 15 grains of bihydrochloride in about 20 minims of water. Local abscess or necrosis are infrequent, and can often be explained: tetanus is an unknown sequel.

A. A.

MACGILCHRIST (A. C.). **Necrosis. Produced by Intra-Muscular Injections of Strong Solutions of Quinine Salts.**—*Indian Med. Gaz.* 1917. Dec. Vol. 52. No. 12. pp. 426-427. With 1 fig.

The author examined the affected parts in a case of cerebral malaria in which an intramuscular (gluteal) injection of quinine bihydrochloride, 11 grains in 34 minims of water, preceded death by a few hours. The site of injection was excised. It was noted that the trace of the needle in the muscular tissue was still patent, attributable to the muscle affected having become necrosed before the needle was withdrawn. Had the patient recovered, the necrosed area would have become a firm fibrous nodule, and most of the quinine would be still in the necrosed tissues. The author has shown elsewhere that very dilute solutions introduced into the muscles are rapidly and completely absorbed and considers that the local hyperaemia induced is beneficial. In his experience of convicts when quinine by mouth failed to reduce the temperature to normal on the fourth day there was found to be some complication, such as tuberculous glands, tonsillitis, pharyngitis or middle ear disease. He has never come across a case of quinine-fast parasites. He gives a "clinical or therapeutical classification of types of malarial infection" which is too long to quote and closes with the following pertinent remarks:—

"In chronic malarial infections a cure (sterilisation of the patient) is impossible, unless quinine is aided by the patient's natural protective forces; hence the value of tonic, e.g., arsenic, change of air, sea voyages, etc. Very little quinine can reach the parasites in the venous sinuses of the spleen and bone-marrow where circulation is slow, and, to reach which, quinine—with its strong affinity for serum proteins—has a long way to go."

[Is there adequate evidence that it is effective when it reaches these retreats?]

A. G. B.

DUFOUR (Henri). **Action thérapeutique de l'alun dans le paludisme, pour suppléer la quinine mal tolérée.**—*Bull. et Mém. Soc. Méd. Hôpît. de Paris.* 1918. Jan. 24. 3 Ser. Vol. 34. No. 1-2. pp. 13-14.

Note of case of chronic subtertian malaria where quinine was ill borne and perhaps not absorbed. After treatment with alum, 0.75 gm. daily, the general condition of the patient was much improved, and after continuation of the alum treatment febrile relapses became less frequent, more brief, and less severe. Equally good results were observed in a second case.

A. A.

SPRECHER (Emanuel). *Beiträge zur Klinik und Therapie der Malaria.*—*Wien. Klin. Woch.* 1918. Mar. 21. Vol. 31. No. 12. pp. 326-328. With 1 chart.

There is not much of interest in this paper. A long account is given of a case of fever and anaemia ending after 4 months in death, in which malarial parasites were never found and malaria was not revealed at the autopsy. The author's cases were old infections from Albania. A prodromal system which he believes to be undescribed is a complaint of sudden severe pain in the splenic region. A synchronous blood examination often shows malaria though an attack may be delayed for some days or not occur at all. The pain is a signal for vigorous treatment. He has succeeded in provoking a latent malaria in some cases by Cori's method and in 84 per cent. [actual numbers not given] by milk injections. The most successful method of treatment was by a mixture of quinine and argochrom (methylene blue silver, Merck), 1 gm. of the former (hydrochloride) and 0.2 of the latter in salt solution injected into a vein. The effect in some cases is described as surprising. In about 50 cases the fever left the patient and parasites disappeared. The trials are not yet completed. A second injection may be given a week later.

A. G. B.

GRUNDMANN. *Ueber chemotherapeutische Versuche und über die diagnostische Bedeutung der provokatorischen Typhusimpfstoffinjektionen bei Malaria tertiana.* [Experiments in Chemotherapy and the Diagnostic Significance of Provocative Typhoid Vaccine Injections in Tertian Malaria.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1918. Mar. Vol. 22. No. 4-5. pp. 55-76.

A long paper in which conclusions based on an experience which seems quite inadequate to bear them are given with much assurance, for instance, that in tertian fever quinine by mouth is far superior to quinine by the needle. The author judges of the permanence of cure in tertian malaria by the result of provocative subcutaneous injections of typhoid vaccine of 1 cc. each; if neither parasites nor fever occur in the course of five injections at 3 days intervals or in the ensuing three weeks cure is assumed to be permanent. After trying other methods of producing relapse with doubtful success the author introduced typhoid vaccine under the skin of eight patients which had resisted, with the result that in 8-21 days all went down with fever, typical malarial attacks with parasites. Two or three injections are usually enough. He regards this as a convenient and safe method, and uses it also to clear up the nature of latent recent infections and atypical attacks of tertian.

A propos of the Bordet-Wassermann reaction in malaria the curious statement is found that the spirochaetes and trypanosomes stand taxonomically near to the Protozoa.

A. G. B.

SEYFARTH (Carly). *Praktische Ratschläge für die Behandlung der Malaria.* [Practical Advice on the Treatment of Malaria.]—*Münch. Med. Woch.* 1918. Apr. 23. Vol. 65. No. 17. p. 457.

A lecture given in the field by the chief of the German 'Sanitätsmission' to Bulgaria. The author, who gives the details of his methods,

believes in interrupted rather than continuous quinine both in treatment and in after treatment and gives it intramuscularly in the first eight days. His maximum daily dose is one gramme. In protracted chronic cases he advises the interpolation of two intravenous injections of neosalvarsan in the course. Chronic cases treated for months with quinine must first be dehabituated (*chininentgewöhnt*) by cessation of quinine for 1-4 weeks. As manifest malaria is easier to treat than the latent form, some of the various ways of producing relapses, about which much has appeared recently in German papers, are advised. A reminder is given that in many so-called quinine resistant cases there is a second factor to be recognised; they are really mixed cases.

A. G. B.

NEUMANN (W.). **Zur Behandlung hartnäckiger, scheinbar chininresistenter Malariafälle.** [The Treatment of Obstinate Apparently Quinine Resistant Cases of Malaria.]—*Deut. Med. Woch.* 1918. May 2. Vol. 44. No. 18. p. 488.

The author in Asia Minor saw 348 malarial patients between August and January. Most did well under Nocht's treatment. Only eight cases, mostly subtertian, were apparently quinine resistant, and these were treated by TEICHMANN's method. In six of these the parasites disappeared in the intervals between the quinine courses. Brief notes of each case are given. All became free from parasites in December and had remained so till January 25 when the communication was sent off. The author surmises that in such cases quinine is stored in the liver, reaching the circulating blood later and then exerting its action on the parasites.

A. G. B.

FORSCHBACH (J.). **Die spezifische Therapie der Malaria.**—*Therapie der Gegenwart.* 1918. Jan. Vol. 59. No. 1. pp. 8-16. With 2 charts.

A paper containing some points of interest but mainly a review of German work. The author remarks that it is quite uncertain whether quinine exerts its effect through the unaltered portion excreted in the urine, or that fixed on the tissues or parasites, or lastly its decomposition products. His results with optochin have not been better than with quinine; the use of this drug is forbidden in the German army. In obstinate cases he favours the employment of salvarsan intravenously at periods about a week removed with quinine in the intervals.

A. G. B.

MATTHEWS (J. Nelson). **The Treatment and Prevention of Malaria.** [Correspondence.]—*Lancet.* 1918. Mar. 16. p. 418.

During three years' experience in South Africa the writer found that in the treatment of benign tertian and quartan malaria a combination of quinine (5-7 gr.) with pure liquid carbolic acid (1 or 2 minims), given 3 or 4 times a day, was of great value.

A. A.

BRAU (P.) & BILLIEMAZ (A.). Inconvénients que peut présenter le traitement quinique appliqué avec trop de rigueur.—*Bull. Soc. Path. Exot.* 1918. Feb. Vol. 11. No. 2. pp. 80-82.

The authors draw attention to a case of albuminuria following prolonged administration of quinine, and to the risk of haematuria after large doses of quinine even in robust patients free from any appreciable renal disorder. Other cinchona preparations are better borne both by the stomach and kidneys, and in the authors' opinion are not sufficiently used in substitution for quinine.

A. A.

AUTRIC. La quinine peut-elle avoir une action pyrétogène chez les paludéens?—*Arch. Méd. et Pharm. Nav.* 1918. Apr. Vol. 105. No. 4. pp. 254-259. With 1 chart.

Having observed cases of subtertian infection where the sudden cessation of quinine treatment was followed by an immediate fall of temperature of some duration, the author suggests that the phenomenon is analogous with Herxheimer's reaction in cases of syphilis under treatment with mercury and arsenobenzol.

If it be admitted that the action of the quinine in destroying the parasites is to liberate toxins that may act on the thermotaxic centre, then the cessation of the quinine will cause a break in this chain of consequences. And if this inference be sound it affords a rational argument for the discontinuous quinine treatment, and also justifies caution in the employment of large doses of quinine in certain cases. The author propounds his argument with temperance and discretion.

A. A.

LE DENTU (René). Au sujet des Injections intra-veineuses de quinine dans le traitement du paludisme.—*Jl. Méd. de Bordeaux.* 1917. July. Year 88. No. 8. pp. 159-161.

After ample experience of intramuscular (gluteal) injections the author gives his experience of intravenous injections of quinine, of which he has given about 1,200 without any ill effects local or general.

He makes a solution of 2 grammes of bromohydrate of quinine in 10 cc. of distilled water, and injects very slowly 1 or 2 cc., or in grave cases 3 or 4 cc.

His conclusions are that in recent infections the intravenous method is quicker and more radically effective than the intramuscular method; and that in chronic infections though it is quicker in breaking the fever it is no less uncertain in effecting a radical cure.

The author describes his technique in detail. His experiences refer to Madagascar.

A. A.

LOEWENSTEIN (E.). Ueber die Wirkung des Chinins auf die Halbmondförmigen der Malaria. [Action of Quinine on Crescents.].—*Ztschr. f. Hyg. u. Infektionskr.* 1917. Nov. 5. Vol. 84. No. 2. pp. 317-322. With 1 plate.

As a result of these experiments in the test-tube it is concluded that quinine has an action on crescents, attacking the protoplasm

but not the chromatin. The precipitation which occurs in the plasma can be seen in both fresh and Giemsa-stained preparations. It does not become visible till quinine hydrochloride reaches a percentage of 0.01, or 0.2 in unstained preparations, and this concentration must be maintained for three hours. Quinine therefore acts best on forms which contain much protoplasm and little chromatin. Hence the high resistance of the male gametocytes of which, the author says, one can convince oneself at the bedside after intravenous injection of quinine.

[No mention is made of control mixtures without quinine, nor is it stated whether such a concentration ever obtains in the circulating blood.]

A. G. B.

RUSZNYAK (Stefan). **Die Erfolge und Ziele der Malaria-therapie**. [Results and Objects of Malarial Therapy.]—*Wien. Klin. Woch.* 1918. Feb. 7. Vol. 31. No. 6. pp. 173-174.

The author writes from an experience at a Hungarian hospital of some 4,000 cases, the great majority old tertian infections, many of which had been discharged "geheilt" from other hospitals. He thinks that at the close of the war only a small fraction will be definitively cured. These cases were treated usually after NOCHT's method of fractional doses; the period of observation after the course was only 4 weeks. Of 500 cases so treated 260 relapsed, in 200 cases before the course was ended. He notes [with others] that fresh cases were nearly always subtertian infections, and that tertian parasites replaced the subtertian in course of time. He disapproves of the artificial production of relapses, on the ground that one can never foretell the outcome of an attack of malaria (a fatal attack may follow a mild) and that one is interfering with the natural processes of immunity.

A. G. B.

MANDOKI (L.) & MAULE (W.). **Erfahrungen über die Behandlung Malariakranker nach Prof. Cori. Bemerkungen zur Frage der Neosalvarsanwirkung.** [The Treatment of Malaria by Cori's Method. The Action of Neosalvarsan.]—*Munch. Med. Woch.* 1918. Feb. 12. Vol. 65. No. 7. pp. 178-179.

CORI's method consists in giving the patient by the mouth very small doses of quinine to bring the parasites, especially the sexual forms, out of the internal organs into the peripheral circulation; the daily dose is 0.05 gm. of the hydrochloride, which he finds in chronic or latent cases brings on an attack or at least causes the parasites to appear in the blood. This provocative treatment was tried by the authors in 123 cases, and was continued for 28 days. Of the 123, 51 had attacks and in 12 others parasites appeared; in 60 the result was nil and of these 7 relapsed as a result of douches to the spleen or injections of horse serum; so that CORI's method is considered the more effective. [No estimate is suggested how many would have relapsed without quinine.] Of the 63 positive cases in 61 the relapse occurred within 20 days.

A relapse having thus occurred CORI gives 0.6 gm. neosalvarsan intravenously, on the same day 2.5 gm. quinine hydrochloride in divided doses, and on the 3 days following 2 gm. quinine. On the 4th day the blood is examined and if it is parasite-free there is a 4 day pause and then a resumption of the provocative quinine. If parasites appear the salvarsan-quinine treatment is repeated. Should the blood on the 4th day not be parasite free he continues the 2 gm. of quinine till it becomes so. Here again the authors followed CORI, giving a second and third course when necessary. They state that of 98 treated 38 were discharged as cured after the first course of treatment, and decreasing percentages after the second and third, the criterion of cure being that the blood remained parasite-free after 28 days provocative quinine.

A. G. B.

GUIART (J.). *De la guérison des fièvres par le quinquina.*—*Paris Méd.* 1917. Dec. 1. Vol. 7. No. 48. pp. vi-viii.

An account of a book with the above title published at Lyons in 1680 by an anonymous author who proved to be François DE MONGINOT. LA FONTAINE in 1682 published a poem on cinchona, taking his details from DE MONGINOT's work. Cinchona had then been known in Europe for 30 years. The writer recommends an infusion in wine and states that 45 gm. of the drug must be given to effect a cure. The drug is given during the attack, in the interval between this and the one which would naturally ensue, and for another fortnight, the dose being gradually reduced. The present author says that DE MONGINOT's work is well worth perusal, and draws attention to an article by BAUFLE on the value of cinchona.

A. G. B.

BAUFLE (Paul). *Le quinquina dans le traitement du paludisme.*—*Paris Méd.* 1918. Apr. 20. Vol. 8. No. 16. pp. 309-315. With 3 charts.

The author does not propose to substitute cinchona for quinine in the treatment of malaria, but considers that its tonic and aperient properties make it a useful adjuvant or alternative to quinine, and he has made observations that lead him to conclude that it is less rapidly excreted. Particularly is it useful in continuation of quinine treatment, and in cases that are resistant to quinine, in cases of gastric derangement and intolerance, and in cases of bilious haemoglobinuria. Other advantages of cinchona are that it is less expensive, and that patients prefer it to quinine.

A. A.

NEUBERGER (Hans) & ATTWENGER (Hans). *Zur Neosalvarsan-Therapie bei Malaria tertiana.*—*Wien Klin. Woch.* 1918. Mar. 7. Vol. 31. No. 10. pp. 266-270.

The authors set themselves to repeat the method of BIEDL.* According to BIEDL previous workers failed with salvarsan because

* *Wien. Klin. Woch.*, 1917. Vol. 30. p. 527. This, the last instalment of a long paper, was overlooked at the Bureau. Its main features, the more speculative apart, are included in the present summary.

they gave it in too small doses and irregularly. As a result of his studies he concluded that the incubation period of benign tertian is 11 days or a multiple thereof and that the attack does not occur till the maturation of the sexual forms for which 5 cycles of asexual division are necessary (5 times 48 hours). For this reason rings as well as gametes may be found in the blood even in the fever-free intervals. In fresh untreated cases neosalvarsan in a dose of 0.9 gm. intravenously causes both sexual and asexual forms of benign tertian to disappear from the peripheral blood within 24 hours. If there is a reason against the use of so large a dose, or there is a double tertian or tertian+subtertian, or if a large number of relapses or quinine treatments have preceded, he recommends three 0.6 gm. injections at intervals of 11 days. A case which remains parasite free for four such periods, that is 44 days, he regards as permanently cured.

The cases of the authors were nearly all old ones previously treated with quinine. Reinfection in the hospital was out of the question. Notes are given of ten. The neosalvarsan *per se* gave satisfactory results but after a failure it was decided to use quinine as well. TEICHMANN'S method was employed [this *Bulletin*, Vol. 11, p. 21], beginning on the day after the first neosalvarsan injection with a dose of 1.0 gm. rising in ten days to 1.8 gm., with a second series after an interval of eight days in which the second injection of neosalvarsan fell; after-treatment according to NOCHT. The authors treated 52 cases, five of which were recent. They report the results in 50. Of these 42 had remained free from relapse (they purposely abstain from labelling them "cured"), or 84 per cent., for the following periods—5, 7 months; 13, 6 months; 6, 5 months; 10, 4 months; 8, 3 months; reckoning from the close of the treatment. The eight cases relapsed on the 22nd, 43rd, 28th, 77th, 56th, 51st, 11th and 37th days: and these intervals are considered to confirm BIEDL'S 11 day incubation period. The inferior results of other workers are attributed partly to the fact that both benign and malignant tertian cases were treated, instead of benign tertian only. Treatment should be instituted as early as possible, either the single dose of neosalvarsan followed by quinine, or, in old cases, the three doses with interpolated quinine. Recovery takes 3-4 weeks at the outside, and it is advised to keep the patients under control for another 3 weeks. [As is the rule in such communications we are not told how cases treated otherwise did during the same period.]

A. G. B.

HUGHES (T. A.). **Note on Intravenous Injections of Tartar Emetic in the Treatment of Malaria.**—*Indian Med. Gaz.* 1918. Feb. Vol. 53. No. 2. pp. 42-45.

The author's observations were made at an Indian hospital in German E. Africa, on 13 cases, of which 10 were subtertian, 2 benign tertian, and 1 quartan; the quartan and two of the subtertian were blackwater convalescents. Crescents were observed in only one of the subtertian cases. During the administration of tartar emetic all quinine was withheld, except in one case.

In the 2 benign tertians, in each of which 3 doses increasing from 10 to 14 cgm. were given, fever and parasites disappeared after the

first injection, and no relapse occurred while the cases were under observation.

In the quartan tartar emetic was given only after an attack of blackwater discountenanced the continuation of intravenous quinine treatment.

The subtertian cases were appreciably affected only by doses which were toxic to the patients; which, in the author's opinion, confirms GREIG's statement that tartar emetic is rather a general protoplasmic poison than a specific poison for the malaria parasites.

A. A.

LEVY (M. D.) & WALL (Dick P.). **The Intravenous Use of Tartar Emetic in Treatment of Malaria.**—*Interstate Med. Jl.* 1918. Mar. Vol. 25. No. 3. pp. 252-255.

The authors used a fresh 2 per cent. solution of tartar emetic sterilised by boiling just before use, and beginning with doses of 1 or 2 cc. gradually increased the dose to 6 cc. Injections were made twice a week.

In benign tertian infections this treatment reduced the temperature, effected a reduction in the size of enlarged spleen, but did not banish parasites from the blood.

In 10 cases of subtertian infection the effect upon symptoms was "practically negligible," and the effect upon parasites was "uniformly negative." The results in all ten cases "were disappointing," and the authors agree with many other investigators "that tartar emetic is not as efficient as quinine in the treatment of aestivo-autumnal malaria."

Two of the 10 subtertian cases are reported in detail.

A. A.

GREIG (E. D. W.) & RITCHIE (W. D.). **A Note on Intravenous Injections of Mercuric Chloride in the Treatment of Enlarged Spleen.**—*Indian Jl. Med. Res.* 1917. Oct. Vol. 5. No. 2. pp. 401-407. With 1 diagram.

Pursuant to a suggestion originating with BARLOW [see this *Bulletin*, Vol. 8, p. 355] the authors have made exact observations of the effect of intravenous injections of HgCl_2 , concurrent with quinine by mouth, on the enlarged spleen of chronic malaria in 50 cases, checking their conclusions by observing the effects of quinine alone in an approximately corresponding number of similar cases under identical conditions. In the one series of cases 11 cc. of a 1-1000 solution of HgCl_2 in normal saline was injected every other day for a fortnight, and 30 grains of quinine were given in tripartite doses daily for that fortnight and the week following: in the check series the quinine alone was given.

The observations are carefully tabulated and compared, and although they do not altogether confirm BARLOW's sanguine conclusions they show that the combination of HgCl_2 and quinine is more effective than simple quinine in reducing an enlarged spleen where the enlargement is considerable and chronic.

The authors therefore consider the combined treatment to be more particularly applicable to cases of considerable enlargement, where the spleen can be felt 3 fingers' to a hand breadth below the ribs.

Salivation etc. occurred in 2 cases, slight phlebitis in 3 or 4, diarrhoea in 5, relapse of fever in 2, and the $HgCl_2$ spoiled several steel needles.

A. A.

HAMILTON (Louisa) & RAWLINS (Morna). **Notes on Two Cases of Benign Tertian Malaria treated by Disodo-Luargol.**—*Lancet*. 1918. Apr. 6. pp. 502-503.

Disodo-luargol is stated to be a safe neutral salt of silver, arsenic, and antimony. It dissolves readily in distilled water, and is injected after filtration, with a glass syringe.

Both cases treated were chronic benign tertian, and had been treated previously with quinine.

The first case received seven intravenous injections of disodoluargol, gradually increasing from 0.05 to 0.25 cgm., at intervals of 3-4 days, along with subcutaneous injections of $1\frac{1}{2}$ grains of Fe. Cit. An attack of fever followed the first injection, but no attack had occurred in 10 months afterwards.

The second received six intravenous injections of disodoluargol, gradually increasing from 0.05 to 0.25 cgm., at intervals of 4-8 days, along with subcutaneous injections of $1\frac{1}{2}$ grains of Fe. Cit. An abortive attack of fever preceded the last injection, but no attack had occurred in the 7 subsequent months.

A. A.

SULDEY (E. W.). **Traitement des accès pernicleux par l'abcès térébenthiné.**—*Bull. Soc. Path. Exot.* 1918. Mar. Vol. 11. No. 3. pp. 179-182.

Having to deal with a series of very heavy malignant tertian infections in which large doses of quinine were ineffectual, and in which many inclusions of parasites in multinuclear leucocytes was observed in the films, the author saw good reason for a line of treatment that should stimulate the production of leucocytes.

The treatment decided upon was that of AUDAIN, who observed experimentally that the best leucogenitive agent is an abscess produced by "essence of turpentine."

In the worst cases, which were most indifferent to quinine, two injections (?subcutaneous) of 2 cc. (?essence of turpentine) were given. The following day, when the abscesses had given rise to strong local reaction, parasites had disappeared completely from the peripheral blood, the multinuclear leucocytes were increased in number (none of them having parasites included), and the clinical condition was much improved; in all cases the result was a cure.

M. LAVERAN criticising the paper supposed that the treatment by turpentine abscess was intended to be adjuvant to specific treatment by quinine.

A. A.

MONTEL (M. L. R.). Splénomégalie, Cachexie palustre et Néosalvarsan.
—*Bull. Soc. Méd.-Chirurg. Indochine.* 1915. Oct. Vol. 6.
No. 8. pp. 288-293. With 1 fig.

The author gives some abstracts of cases of splenomegaly where striking results followed injections of neosalvarsan. In two cases of recent enlargement a remarkable amount of shrinkage occurred after the second injection: and in one case of enormous enlargement of six years' standing, where the area of splenic dulness extended from the left axilla to the pubis, the spleen returned to the normal size after six injections given at intervals during 2 months. The dosage in this case was 50 cgm. at the first injection and 90 cgm. at each of the other five.

A. A.

PAIS (Antonio). L'influenza dei raggi X sulla malaria. (Nota preventiva). [The Influence of X Rays on Malaria. Preliminary Note.]
—*Gaz. Ospedali e d. Clin.* 1917. Oct. 21. No. 84. pp. 1123-1124.

The author has tried the effect of X rays on 50 patients suffering from different types of malarial fever. The rays were applied in the form of diffuse irradiation of the splenic area, protected by an aluminium filter 1 mm. thick. It is claimed that small doses of X rays given in a primary attack of malarial fever, not treated with quinine, retard the febrile attack and render it more benign. The benefit, however, is rarely prolonged and practically never produces a cure by itself. Heavier doses change the character of the infection, and produce sub-intrant paroxysms. Medium doses, in chronic rebellious cases, after prolonged quinine treatment, may bring about a complete cure, or render the case more amenable to the action of quinine. Further details are promised in a future communication.

J. B. N.

GAIDE. Paludisme et splénectomie.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1916. July. Vol. 7. No. 7. pp. 212-215.

Two cases of removal of the spleen for enlargement due to malignant tertian infection. The first was quite successful as an operation, but the patient succumbed on the following day after a violent attack of fever in which the temperature rose to 104° F. As parasites were not to be found immediately before the operation but were present in abundance during the febrile attack, and as the autopsy brought to light nothing wrong with the wound, the author considers that death was due to the malarial infection.

The second case also was quite successful as an operation, and the patient was discharged in good condition about 4 months afterwards; but about 3 months thereafter he had relapses of fever, and about 6 months after that he was again in hospital with numerous parasites in the blood.

A. A.

GARIN (Ch.) & PASQUIER (Ch.). Choix de l'emplacement et organisation intérieure d'un grand hôpital de paludéens.—*Progrès Méd.* 1917. Dec. 8. No. 49. pp. 427-429.

The author observes, with regard to the site for a malaria hospital, that it is necessary in the interests of the surrounding population

to choose one where *Anopheles* mosquitoes are absent or at least scarce. An altitude of, or above, 1,000 metres is propitious [in fixing on 1,000 metres the author must be presumed to be considering temperate latitudes only], since at such elevations the cold is unfavourable both to *Anopheles* and to the development of malaria parasites within the insect, and furthermore a high altitude is directly beneficial to malaria patients.

As regards its organization and administration, the hospital should be specialised for the treatment of malaria; the patients should be employed as much as possible in its multiplex services; and all the opportunities that it affords for the study of malaria should be made the most of.

A. A.

HIRSCH (S.). Ueber den Ausfall der Wassermannreaktion bei Malaria.
—*Ztschr. f. Hyg. u. Infektionskr.* 1917. Nov. 5. Vol. 84.
No. 2. pp. 323-324.

The cases examined came from Albania. In all parasites were found in the blood, the gravest cases were selected—with malarial cachexia, large spleens and liver, high degree of anaemia—the blood was obtained during or directly after an attack, and none had yet started their quinine treatment. Of the 78 cases 44 were subtertian, 6 subtertian and tertian, 28 tertian. Only one had any sign of syphilis. The results may be tabulated thus:—

	Number.	Number positive at first.	Number positive after 3 weeks treatment.
Subtertian	44	12	3
Subtertian + tertian ..	6	4	0 (out of 3)
Tertian	28	12	2 (out of 7)

It is concluded that a positive Bordet-Wassermann is due neither to the presence of malarial parasites, fever, nor splenic and hepatic swelling, and that as regards malaria it has no diagnostic or prognostic significance.

A. G. B.

PRINS (G. A.). Zur Klinik der Malaria.—*Deut. Med. Woch.* 1918.
Jan. 31. Vol. 44. No. 5. pp. 132-133.

Notes on the Bordet-Wassermann reaction in malaria. In patients from the tropics with malaria and a positive Bordet-Wassermann the author advises 6 weeks quinine treatment before deciding whether the reaction is due to malaria or syphilis. In one such case where the symptoms were vague and no parasites were found syphilis was diagnosed (W. R. + 10). After a second injection of the salicylate of mercury the temperature rose and subtertian parasites were found. Two months quinine treatment followed, the fever disappeared but

headache persisted (W.R. +6). Antisymphilitic treatment relieved the symptoms and the reaction was reduced to +5. The patient was well a year later. Here a share in the positive reaction is attributed to both diseases.

A. G. B.

MAY (Etienne). *Recherches sur la résistance globulaire des paludéens.*—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1918. Mar. 7. Vol. 34. 3 Ser. No. 7-8. pp. 193-197.

Some authors, who have experimented with the whole content of the blood have observed increased globular resistance in the course of a malarial paroxysm; others have described a lessened resistance during the paroxysm and a normal resistance during the intervals. The present author, working with plasma-free corpuscles, finds that when malarial patients are admitted to hospital, after a series of paroxysms, the resistance is normal or slightly lessened, but sometimes is slightly increased; during the apyretic interval if an examination be made on days immediately preceding a relapse there is almost always a distinct globular fragility; after the relapse the resistance makes for and sometimes reaches normal, and very exceptionally goes beyond normal. Sometimes, particularly with patients under regular treatment, when the relapses are mollified or latescent, the same periodic modifications of the globular resistance can be observed.

A. A.

LEGER (Marcel). *Paludisme et coagulabilité du sang.*—*Bull. Soc. Path. Exot.* 1918. Mar. Vol. 11. No. 3. pp. 173-179.

To estimate the coagulability of the blood the author followed the method of Marcel BLOCH. Blood taken from a vein is kept from coagulation by dilution with three times its volume of citrated solution, and then a .05 per cent. solution of chloride of calcium is gradually added until the coagulation point is reached.

From a series of observations the author concludes that in infections with *P. vivax* the coagulability of the blood is not affected; while in infections with *P. praecox* [= *falciparum*] it is increased—markedly and persistently so in pernicious cases.

The author thinks that this increased coagulability is due to the greater destruction of red blood-cells in malignant malarial infections, since loss of blood is known experimentally to augment coagulability; though he notes that this explanation is at present inconsistent with the fact that in haemoglobinuric paroxysms coagulability is not affected. He suggests that there may be some connexion between increased coagulability and augmentation of haematoblasts.

A. A.

SAUPE (Erich). *Ueber Urobilinogenurie bei Malaria.*—*Arch. f. Schiff-u. Trop.-Hyg.* 1918. Jan. Vol. 22. No. 2. pp. 17-27.

The reagent used is a 2 per cent. solution of dimethylamidobenzaldehyde in hydrochloric acid. Its use and the colour reaction obtained

are described. Urobilinogenuria is said to be a constant symptom in malaria just as is urobilinuria. Its occurrence in enteric and typhus fevers is also referred to. It does not occur, at least to an appreciable extent, in Wolhynia fever.

A. G. B.

PORAK (René). *La cholestérinémie dans le paludisme*.—*C. R. Soc. Biol.* 1918. Apr. 13. Vol. 81. No. 7. pp. 311-312.

Hypocholesterinaemia is constant in continuous malarial fever as in typhoid and paratyphoid; it has therefore no diagnostic significance. But in early malarial infection it is, according to the author, of prognostic importance, since the amount of cholesterol present in the serum diminishes with the gravity of the case.

In sixteen cases of chronic malarial infection cholesterinaemia was normal in 9, increased in 3, and diminished in 4.

A. A.

TRIBONDEAU (L.). *Sur la recherche de l'hématozoaire de Laveran*.—*Bull. Soc. Path. Exot.* 1918. Mar. Vol. 11. No. 3. pp. 196-205. With 3 figs.

Describes in great detail the method of making, fixing, and staining blood-films. The author recommends making both a thin and a thick film on one and the same slide, and dehaemoglobinising the thick film in a mixture of 1 part of absolute alcohol to 2 parts of distilled water.

All the processes involved in the manufacture of a double eosinate blue stain are also described in detail.

A. A.

SCHUEFFNER (W.) & SWELLENGREBEL (N. H.). *Die Anopheleiden in Deli im Verband mit der Verbreitung der Malaria*. [Also in Dutch.]—*Meded. Burgerlijk. Geneesk. Dienst in Nederl.-Indië*. 1917. No. 4. pp. 1-24. With 3 plates & 1 fig.

The authors give tables, with commentaries, showing the incidence of the several kinds of malarial infection in the different districts of Deli [Sumatra]. They show that from 1899 to 1912 the number of cases increased gradually from 10 per mille to 43 per mille, and still further in the first half-year of 1913 to 79 per mille. The majority of cases occur in the period from November to April.

Good diagnoses of the local *Anopheles* are given and also of their local distribution. They comprise 9 species—namely, *A. ludlowi* Theob., *A. albirostris* Theob., and *A. barbirostris* v. d. Wulp., all three of which are carriers; *A. kochi* Dönitz, *A. leucosphyrus* Dönitz (= *elegans* James), *A. sinensis* Wied., and *A. albotaeniatus* Theob., the pathogenity of all of which is said to be doubtful; *A. rossi* Giles, which the authors consider to be harmless as regards malaria; and *A. punctulatus* Dönitz (= *tessellatus* Theob.), the status of which is stated to be still unknown. All nine species are roughly figured.

A. A.

SCHUEFFNER (W.) & VAN DER HEYDEN (H. N.). *Die Anopheliden in Nederländisch - Indien*. [Also in Dutch.]—*Meded. Burgerlijk. Geneesk. Dienst in Nederl.-Indië*. 1917. No. 4. pp. 25-41. With 1 plate.

A critical revision of the species of *Anopheles* occurring in the Dutch East Indies, with a key for their identification.

Sixteen species are included, of which three, namely *A. umbrosus*, *A. aconitus* (= *albirostris*), and *A. ludlowi*, are described as very dangerous carriers; eight, namely *A. barbirostris*, *A. sinensis*, *A. punctulatus* (= *tessellatus*), *A. leucosphyrus*, *A. karwari*, *A. rossi* var. *indefinitus*, *A. maculatus*, and *A. fuliginosus*, as carriers simply; two, namely *A. argyropus* and *A. schuffneri*, as doubtful; and three, namely *A. albotaeniatius*, *A. kochi*, and *A. gigas*, as harmless. Six of the species are roughly figured.

A. A.

ANDERSON (A. R. S.). *Quinine in Malarial Prophylaxis*.—*Indian Med. Gaz.* 1918. Feb. Vol. 53. No. 2. pp. 45-48.

The author's experience of the prophylactic value of quinine is unfavourable.

In the female jail at Port Blair, with an average population of 390 convicts, every other woman in each barrack received from May to September, 1901, 3 or 4 grains daily and from October to February 20 grains on Saturday and 20 grains on Sunday. The average number of women admitted to hospital monthly for malarial fever was 34, of which nearly half had received the prophylactic treatment.

During the rainy season of 1907 (mid June to mid September) "quinine was given to all persons on admission into the subjail [of Nattore in E. Bengal] for a week 15 grains daily," in the language of the Assistant-Surgeon in charge. The daily average population of the subjail for the 4 months June-September was 13.05, 6.02, 16.25 and 15.26, and the cases of malaria were 1, 4, 2, and 0, respectively.

In the rainy season of 1910 and 1911 the prisoners in one barrack of the Chittagong jail were given 15 grains twice a week, while those in the adjacent barrack were not. In 1910 the number of cases of malaria among those on quinine was 10, and among the others 16. The corresponding figures in 1911 were 5 and 6. The population of the two barracks was approximately equal.

In 1914 and 1915 one set of prisoners in the Dacca Jail received 10 grains every Saturday and Sunday, and another set did not. For 9 months the percentage of cases of malaria was less among those who had received quinine than among the others, while for 13 months the percentage was reversed.

The author admits that his argument is lacking in scientific precision, and does not question the value of quinine, in suitable doses, in the treatment of malarial infections.

A. A.

TREADGOLD (C. H.). *The Prophylactic Use of Quinine in Malaria: With Special Reference to Experiences in Macedonia*.—*Brit. Med. J.* 1918. May 11. pp. 525-529.

The greater part of this paper is ratiocinative, and from an analysis of some 201 papers published since 1880 the author concludes that

small prophylactic doses of quinine not too long continued are of proved value for the natives of malarial countries, but are of very limited use to immigrants.

Of 201 writers on the subject 134 are in favour of the preventive use of quinine, 27 are favourable but with reservations, and 40 are against; but more than half these writers give no statistics, and of those who do base their conclusions on statistics only 34 have controlled their observations.

Analysing the literature still further, the author elicits the interesting fact that every one of 23 observers who have practised on indigenes exclusively, and have also controlled their experimental treatment, are in favour of the preventive use of quinine; though the statistics of some among them—e.g., CELLI and the SERGENT brothers—are not very impressive.

The author's own observations include, *inter alia*, blood examinations of 125 men of the forces in Macedonia who, though on duty were infected and subject to relapses, and whose quinine orders (which are not necessarily synonymous with intake) were known. These are recorded as follows:—

Group.	Number examined.	Number with parasites.
No quinine in intervals	26	16
30 gr. daily	21	11
20 gr. daily	9	6
15 gr. daily	6	4
10 gr. daily	48	22
15 to 30 gr. bis weekly	11	3
6 gr. daily and 12 gr. bis weekly ..	4	3

A. A.

FERMI (Claudio). *Sull' effettuato risanamento antimalarico di Trinitapoli.* [The Successful Antimalarial Campaign at Trinitapoli.]—*Malariologia*. 1918. Feb. 28. Ser. 2. Year 4. No. 1. pp. 2-23.

The district of Trinitapoli (province of Capitanata, Italy) suffered severely during the two years 1915-1916 from an outbreak of malaria, due to excessive rainfall followed by an extraordinary abundance of mosquitoes. In the year 1916 alone there were 178 deaths from malaria out of a total of 734 from all causes. The author was sent to the district by the central authority to deal with the outbreak, and by filling up some of the collections of water, and salting others with common salt to prevent the development of larvae, he was quickly successful in subduing it. The account given of the operations is not very easy to follow, from the absence of any map of the district.

J. B. N.

MARCHIAFAVA (Ettore). *Sulla malaria pernicioso.*—*Malariologia*. 1917. Oct. 15 & Dec. 31. Ser. 2. Year 3. Nos. 5 & 6. pp. 97-115; 121-137.

A clinical lecture, dealing with the subject indicated by the title, in all its aspects and with great fulness, but not containing anything novel.

J. B. N.

- i. VISBECQ. **Une mission militaire antipaludique.**—*Paris Méd.* 1917. Dec. 1. Vol. 7. No. 48. pp. 463-465.
- ii. McCULLOCH (Champe Carter). **The Prophylaxis of Malaria.**—*Amer. Jl. Med. Sci.* 1918. Jan. Vol. 153. No. 1. (No. 550.) pp. 10-33. With 9 figs.
- iii. BERNARD (A.). **Le paludisme et ses acquisitions récentes.**—*Progrès Méd.* 1917. Dec. 8. No. 49. pp. 413-424. With 6 figs.
- iv. ROSENTHAL (Georges) & BLOCH (Sigismond). **Paludisme autochtone. Aortite subaigue paludéenne. Injections intraveineuses de quinine. Régression des symptômes.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1918. Feb. 21. 3 Ser. Vol. 34. Nos. 5-6. pp. 166-169.
- v. MOREIRA (A. A. Santos). **Infantilisme Paludéen. Avec une appréciation sur l'infantilisme en général.**—*Arch. Méd. des Enfants.* 1918. Jan. Vol. 21. No. 1. pp. 30-32.
- vi. SCHUEFFNER (W.). **Die Brutplätze der Mücken, deren Behandlung und kurze Bemerkungen über die Aussichten einer Malaria-bekämpfung.** [Also in Dutch.]—*Meded. Burgerlijk. Geneesk. Dienst in Nederl.-Indië.* 1917. No. 4. pp. 48-62.
- vii. NICLOT. **A propos de la densité anophélienne, en matière de paludisme.**—*C. R. Soc. Biol.* 1918. Mar. 9. Vol. 81. No. 5. pp. 271-272.
- viii. LÉGER (L.) & MOURIQUAND (G.). **Sur l'hibernation des Anophèles en Dauphiné.**—*Progrès Méd.* 1917. Dec. 8. No. 49. pp. 426-427.
- ix. DUNN (Lawrence H.). **A Simple Method of Identifying the Anopheles Mosquitoes of the Canal Zone.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1916. July-Dec. Vol. 9. Pt. 2. pp. 64-68.
- x. LANGERON (M.). **La larve d'*Anopheles chaudoeyi* (Theobald, 1903).**—*Bull. Soc. Path. Exot.* 1918. Apr. Vol. 11. No. 4. pp. 291-297. With 8 text-figs.
- xi. SWELLENGREBEL (N. H.). ***Myzomyia rossii* Giles, *M. ludlowi* Theobald und *M. indefinita* Ludl.** [Also in Dutch.]—*Meded. Burgerlijk. Geneesk. Dienst in Nederl.-Indië.* 1917. No. 4. pp. 42-47. With 1 plate.
- xii. LÉENHARDT & TIXIER (Léon). **Les injections systématiques intramusculaires de quinine dans le traitement du paludisme.**—*Presse Méd.* 1918. Mar. 4. Vol. 26. No. 13. pp. 119-120.
- xiii. ——. **Le traitement du Paludisme au Centre spécial de la 3e Région.**—*Progrès Méd.* 1917. Dec. 8. No. 49. pp. 424-426.
- xiv. RAVAUT (Paul). **La suppression des troubles gastriques déterminés par la quinine au cours du traitement du paludisme.**—*Presse Méd.* 1918. Mar. 18. Vol. 26. No. 16. p. 146.
- xv. COLT (G. H.). **Quinine in the Treatment and Prevention of Malaria.** [Correspondence.]—*Lancet.* 1918. Mar. 9. p. 384.
- xvi. GAIDE. **Rapport sur le fonctionnement de la quinine d'Etat et sur la lutte contre le paludisme en Annam.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1916. Dec. Vol. 7. No. 10. pp. 383-394.

- xvii. CARLES (Jacques). *Les diverses méthodes de traitement du paludisme subaigu et chronique. Leurs résultats.*—*Jl. Méd. de Bordeaux*. 1918. Jan. Vol. 89. No. 1. pp. 3-9. With 6 charts.
- xviii. KNIGHTON (J. E.). *Some Manifestations of Malaria relative to Digestive Disturbances.*—*Southern Med. Jl.* 1918. Feb. Vol. 11. No. 2. pp. 98-99. With 1 fig.

i. A resumé of the anti-malarial programme conducted by the sanitary officers of the French army in Macedonia, another account of which has already been noticed in this *Bulletin*, Vol. 10, p. 172.

ii. This paper is of the nature of an invocation to new-commissioned medical officers: it gives a good summary of the subject both from the historical and from the practical point of view.

iii. This is a very good article on malaria, but it does not profess to be original. A considerable bibliography is appended, in which however very few British authors are included.

iv. Gives the details of a case which is sufficiently summarised in the title. The rarity of visceral lesions in the malarial fever indigenous to France justifies a detailed report.

v. Appears to be an abstract of a clinical address in which infantile malaria is merely referred to occasionally in illustration of theories of "infantilism" generally.

vi. A discursive and suggestive essay which does not, however, appear to contain anything novel.

vii. The author emphasises the number of Anopheles as an important factor in malarial problems—epidemiological, clinical, and endemical.

viii. The facts that *A. bifurcatus* hibernates as a larva and *A. maculipennis* as an adult are again confirmed.

ix. So far, 11 species of Anopheles have been found in the Panama Canal region: only 7 of them are common, and the author gives a table for the identification of these.

x. *Anopheles chaudoyei* Theob. is one of several species that have been held to be synonymous with *A. turkhudi* Liston. The author provides materials for settling this question in a very careful description of the larva of *A. chaudoyei* which is of common occurrence in the oases of N. Africa.

xi. A discussion as to the specific status of the forms named. The author concludes that an extensive biometric investigation is necessary to settle the question.

xii. Describing in detail, and advocating, the intramuscular method of injecting quinine, which, in the authors' experience, is the most efficacious method for breaking the fever, improving the general condition, and postponing relapses.

xiii. The greater part of this paper is occupied with the intramuscular method of administering quinine, which the authors prefer because of its immediate effect, the certain absorption, and the better and more equable distribution of the drug.

xiv. Recommends that quinine should be enclosed in a capsule that resists gastric juice but yields to the intestinal juices, and makes some tentative suggestions on this point.

xv. The writer appears to be unfamiliar with recent work on absorption and elimination of quinine.

He has noticed in chronic malarias the phenomenon of relapse after surgical doings even of a minor kind and even with local anaesthesia, and he thinks that as such relapses usually occur when the urine is loaded with lithates there may be some "connexion between nitrogenous metabolism and the recurrent attack."

xvi. This paper consists of a reprint of an official circular addressed to the provincial medical officers of Annam regarding the prophylactic issue of quinine and of a general expression of satisfaction with its result.

xvii. A discourse on the treatment of malaria containing much well digested information but nothing novel. From the military point of view the author thinks that a man who has been seriously infected with malaria is unfit for service until the lapse of six months to a year.

xviii. The author draws attention to cases, at times numerous, of gastric derangement suggestive of ulcer, which are really latent malaria and are relieved by antimalarial treatment. The importance of these cases is not so much clinical as in the fact that they may be unsuspected carriers.

A. A.

SCHITTENHELM (A.) & SCHLECHT (H.). *Erfahrungen über die Malaria und ihre Behandlung.*—*Deut. Med. Woch.* 1918. Mar. 21. Vol. 44. No. 12. pp. 314–316.

. PEWNY (Walther). *Präzipitinversuche bei Malaria.*—*Wien. Klin. Woch.* 1918. Feb. 14. Vol. 31. No. 7. pp. 205–206.

Ueber Parasitolytine bei Malaria.—*Ibid.* Feb. 21. No. 8. pp. 234–235.

iii. BOEHM. *Hämatologische Studien bei Malaria.*—*Arch. f. Schiffs- u. Trop.-Hyg.* 1918. Mar. Vol. 22. No. 4–5. pp. 49–55.

i. The authors describe a case of oedema of the face and feet and other less definite symptoms which proved to be due to malaria. They have made a few experiments on the excretion of quinine in the urine and were unable to confirm the results of TEICHMANN and NEUSCHLOSZ [see this *Bulletin*, Vol. 11, pp. 21 & 25].

ii. A brief account, without protocols, of investigations on the subjects of the titles. The conclusion is that such immune bodies may be formed in malaria but that further work to demonstrate them is necessary.

iii. A sketchy account of the blood changes in malaria, containing nothing new.

A. G. B.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES
BULLETIN.

Vol. 12.]

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[No. 2.]

UNCLASSED FEVERS OF THE TROPICS.

MONTEL (M. L. R.). 2^e note sur des cas de fièvre continue observés en Cochinchine "Ban-bach."—*Bull. Soc. Méd.-Chirurg. Indochine*. 1916. Feb. Vol. 7. No. 2. pp. 51-60. With 1 chart.

In 1910 the author first described cases of this fever as a characteristic endemic disease. In 1912* SARAILHÉ published a long and interesting paper on "la miliaire cristalline fébrile ou Ban-bach," in which he appears to have included some doubtful cases. In the present paper the author repeats a great deal of his original description and adds some further observations. The disease is limited to Cochin China, not being found in Tonkin, has an insidious onset followed by a prolonged continued fever of six weeks to two months, and is terminated by lysis. It is attended by slight pulmonary catarrh and generally a very abundant vesicular eruption which is difficult to see unless carefully looked for. The eruption commences round the neck but may be generalised and is almost confluent in character; it is followed by slight desquamation. It comes out in successive periods giving some relief of the symptoms, constipation is persistent, the skin is dry, the conjunctivae yellowish, the eyes shining; there is profound lassitude and the patient may die in a condition like that of typhoid. As a rule the appetite is good. The spleen and liver are enlarged and tender, pulse rapid and compressible, and delirium may be present; convalescence is protracted.

He reports three new cases. Two were from the same house, children who slept in the same bed. The third was a European, and in this case no eruption was detected. In all these, following the fever, there was a complete loss of hair, which is looked upon as characteristic of the fever. Blood examinations showed an absence of parasites and serum diagnosis was negative for typhoid and para-typhoid A and B.

The disease is occasionally of a milder character but it is considered to be a specific entity and probably infectious.

P. W. B-S.

* *Bull. Soc. Méd.-Chirurg. Indochine*. Vol. 3. pp. 253, 317, 365 & 463. (C477) Wt.P926/16. 1,400. 8.18. B.&F Ltd. Gp.11/4

THOMSON (J. Gordon) & HIRST (L. F.). Reports from the Pathological Laboratories of No.—General Hospital, Alexandria. I.—Bacillaemia due to Various Organisms.—*Lancet*. 1918. Apr. 20 pp. 566–567.

This is a preliminary report of bacteriological work done at a General Hospital, Alexandria, relating to bacillaemia of intestinal origin. The following interesting table of haemocultures made in 1916 is given.

		Neg.	Typh.	Para "A"	"B"	<i>B. faec. alk.</i>
Jan.-March	..	260	2	42	4	1
April-June	..	115	3	10	1	14
July-Sept.	..	107	6	12	3	4
Oct.-Dec.	..	43	1	3	1	4

Geographical Distribution.

Salonika	..	..	1	2	1	2
Mesopotamia	..	..	—	10	—	1
Egypt	..	..	11	55	8	20

The greater number of Para "B" infections originated in Gallipoli, and there were very few clinically enteric cases in the early part of 1917, up to date of report.

The authors believe that with care, agglutination observations, even after T. A. B. inoculation, will often help in the diagnosis. The importance of *B. faecalis alkaligenes* as a causative agent of slight fevers is again brought forward, and Hirst's original views as to their etiology are maintained, viz., that the bacillus multiplies under favourable conditions in the bowel and occasionally gains access to the blood stream through damaged mucous membrane. They found that as a rule *B. coli* bacillaemia was a purely secondary infection, following ulceration of the intestines, but when in the blood, it may cause a mild pyrexia, like that produced by *B. faecalis alkaligenes*.

P. W. B-S.

NEUKIRCH (Paul). Ueber menschliche Erkrankungen durch Bazillen der Glässer-Voldagsengruppe in der Türkei. [Cases in Turkey due to Bacilli of the Glässer-Voldagsen Group].—*Ztschr. f. Hyg. u. Infektionskr.* 1918. Feb. 1. Vol. 85. No. 1. pp. 103–145. With 1 plate & 24 charts.

The author describes 27 cases in detail, and gives many cultural and agglutination tables showing the results obtained. He divides the cases into four groups; Typho-septic, 15; Enteritis, 4; Dysentery, 7; Pyonephritic, 1. Out of 100 cases with 50 deaths at Erzindjan clinically diagnosed as dysentery, 25 showed *B. Erzindjan* in the blood when bacteriologically examined. The *B. Erzindjan* culturally is closely related to the *B. paratyphosus* B and the *suipestifer* group, but it can be differentiated by serum tests as demonstrated in the agglutination tables given. In the body the organism is widely distributed.

Isolation of B. Erzindjan.

	Erzindjan.	Constantinople.
Blood	18	20
Urine	1	30
Faeces	4	1
Organs, P.M. ..	6	12
	—	—
	29 times	63 times
	—	—

(from 25 patients) (from 19 patients).

Out of 4,000 patients treated in the lazaretto, there were 49 cases of *B. Erzindjan* infection, 3 of typhoid, 2 of para B and 15 of para A. The mortality rate was, for typhoid and para A and B, one case only; typho-septic type of *B. Erzindjan*, 46 per cent.; dysenteric type, 6-7 per cent.

Conclusions.

(1). In Anatolia a bacillus occurs which belongs to the Glässer-Voldagsen group (*B. Erzindjan*) and causes an epidemic infection in human subjects. (2). The epidemic infection has either a typho-septic or dysenteric character. (3). The bacilli are closely related serologically to para-typhoid B, but were constantly agglutinated by Glässer-Voldagsen or homologous sera. (4). Frequently in one and the same patient serologically differing varieties were found together.

P. W. B-S.

WEIL (E.). *Paratyphus B-ähnliche Krankheitserreger (Typus Suipestifer Voldagsen) in Albanien.* [*B. suipestifer* as a Cause of Disease resembling Paratyphoid B Fever.]—*Wien. Klin. Woch.* 1917. Aug. 23. Vol. 30. No. 34. pp. 1061-1063.

The author records that in the autumn of 1916 Weil and SAXL (*Wien. Klin. Woch.* 1917, No. 17) observed three doubtful cases of fever from which they obtained, from blood and urine, certain germs resembling *B. paratyphosus* B; but which, after more careful culture and agglutination tests, proved to be *B. suipestifer*. His own experience in Albania has shown that during autumn and winter many cases occur which resemble typhoid and paratyphoid fever clinically but are caused by *B. suipestifer*, generally found in the urine. There is also some agglutination with paratyphoid B immune serum. The author considers that the infection is spread by the bacilli contained in the urine.

J. H. T. W.

FREUND (Ernst). *Ueber eine eigentümliche im Hinterland beobachtete Epidemie mit klinischen Beziehungen zu Paratyphus und Fünftagefieber.* [On a Peculiar Epidemic observed in the Interior with Clinical Relationship to Paratyphoid and Five Day Fever.]—*Wien. Klin. Woch.* 1917. Nov. 8. Vol. 30. No. 45. pp. 1422-1424. With 13 charts.

In an enclosed camp of men fed from a common source, 115 out of 400 were attacked with the disease within three days. The symptoms (C477)

were fever, malaise, shivers, and headache, with coated tongue and enlarged spleen. After 2 or 3 days the fever usually passed off, but in some it recurred with the usual five day interval. Shin pains were commonly noted. Bacteriological examinations gave negative results.

The rapid onset in such a large proportion of men in the camp suggests typhus and certainly lice were present, but the author excludes this disease because the camp guards were not affected and the epidemic ceased abruptly, which appears very much as if he desired to hide an outbreak of typhus and confuse it with five day fever, though some cases of the latter were undoubtedly present.

P. W. B-S.

HENAO M. (Emiliano). *La fiebre de Tacamocho.* [Tacamocho Fever.] —*Repertorio de Med. y Cirug.* 1918. Jan. Vol. 9. No. 4. (No. 100.) pp. 171-207. With 2 charts.

An account of 5 cases of an anomalous form of fever, which appeared among the railway staff at a station called Tacamocho on the Antioquia Railway, Colombia, in August 1915. Two of the patients died, within 48 hours of the commencement of the attack, in a comatose state with convulsions, while the other three recovered. The disease commenced with high fever, vomiting, intense headache and diarrhoea. The vomit in some of the cases contained blood and in others was simply bilious. The liver was not enlarged. Later on, there occurred temporary suppression of urine in the cases that recovered, followed by restoration of the secretion with albuminuria. The febrile period extended over 4 days in a case that recovered, but the two that died succumbed in the middle of the febrile period. The liver, spleen and stomach of one of the fatal cases were sent to the Wellcome Research Laboratory in London for an opinion, but the microscopic findings were not conclusive of yellow fever. No decisive opinion is expressed by the author of the paper, who is medical officer to the railway, as to the nature of the disease. No further cases have occurred to date. Some *S. calopus* were caught in the neighbourhood.

J. B. N.

LOUGHNAN (W. F. M.). *Notes on Pyrexia of Uncertain Origin.*—*West London Med. Jl.* 1917. Apr. Vol. 22. No. 2. pp. 65-71. With 5 figs.

The author states that the term "P. U. O." is often, and in particular to officers in India, of the greatest value. He then gives descriptions of cases with charts, which fall under types given by MANSON of non-malarial intermittent and low fever, with instances of cases of probable dengue with and without the secondary rise of temperature, and finishes up with some typical instances of trench fever. The term "P. U. O." for most of these cases appears therefore to be wrong.

P. W. B-S.

MASUDA (T.). [Vitreous Humor Dulness following Attacks of Obscure Fever in the City of Kyoto, Japan.]—*Iji Shimibun. (Medical News)*. 1917. June 25. No. 976. pp. 793-798.

[From Review by R. G. MILLS.]

The condition was found in cases described as seven day fever in which INEDA had found a spirochaete. Both eyes are usually affected and the lesion manifests itself some little time after the fever has disappeared. The former class suffered most, generally males in the middle adult age. The fever was clinically distinguished from epidemic jaundice and syphilis, in which diseases a similar condition is found. The cloudiness is at first limited to the anterior part of the vitreous, showing a radiating and stringy appearance, and the retina is not involved.

P. W. B-S.

BRITISH MEDICAL JOURNAL. 1918. Mar. 23. pp. 354-355. **Transmission of Trench Fever by the Louse.**

This is an extremely interesting and important report of a Committee for the study of trench fever, under the presidency of Sir David BRUCE. The experiments were carried out in England at the Hampstead Military Hospital, and were free from all possible sources of error, the feeding of the lice being controlled by Mr. BACOT. Two volunteers were repeatedly bitten by lice taken from infective trench fever cases, with entirely negative results. A second experiment was carried out with two other volunteers, differing however in that a small area of skin was slightly scarified and a small quantity of the dried excreta of the lice fed on trench fever cases was rubbed in. Both these men developed typical symptoms of the disease, indistinguishable from the fever produced in volunteers by an injection of the whole blood of trench fever cases which had contracted the disease in France. The success was so marked that three fresh volunteers were treated in the same way with again positive results, the incubative periods being six, seven, and eight days. The chain of evidence was completed by the fact that a small quantity of blood taken from one of these three on the second day of the fever and injected into other men produced a typical attack after an incubation of five days.

These experiments show that the bite alone is not sufficient to produce the attack of trench fever, but that when the excreta of infected lice are scratched into the skin the disease follows after a period of about eight days.

This knowledge will have a very wide bearing on the methods taken for the prevention of the disease. Further experiments are being carried out to prove whether the disease is spread from man to man by lice, or simply from the louse to man.

P. W. B-S.

STRONG (R. P.), SWIFT (Homer F.), OPIE (E. L.), MACNEAL (Ward J.), BAETJER (Walter), PAPPENHEIMER (A. M.) & PEACOCK (A. D.). **Report on Progress of Trench Fever Investigations of Trench Fever Commission of Medical Research Committee American Red Cross.**—*Medical Bulletin*. 1918. Mar. Vol. 1. No. 5. pp. 376-383.

This is a preliminary report of the work done at a base hospital in

France by the American Red Cross Committee, co-operating with the English authorities. The points which they undertook to investigate were the method of transmission of the disease and the infective properties of the blood. Sixty-eight healthy robust men of the United States Army volunteered for the experiments and very elaborate precautions were taken to isolate these men from the hospital cases and to prevent them becoming lousy. Thirty-four men were employed in the blood inoculation experiments. Of these, sixteen were inoculated with the whole blood and fifteen developed the disease. Five were treated with clear, unfiltered plasma, all of whom contracted the fever; four with washed corpuscles with three positive results; five with filtered plasma, and two with extract of ground corpuscles filtered before inoculation, none of whom contracted the disease. The incubation period of those inoculated by blood varied from 5-20 days. The blood appears to be most infectious on the first and second day of the disease, and more infectious during the first attack than in the relapse, and the infection was carried through three generations from an original case in three series of experiments. A relative immunity of some men was demonstrated by prolonged incubation, mildness of disease produced, or failure to contract the fever. Twenty-six were subjected to experiments with lice (*Pediculus corporis*), which had fed on trench fever cases, adequate controls being used; twelve of these contracted the fever. The lice were placed on the skin of the patient in cells which also contained their excreta, and occasionally on removal a dead crushed louse was found from unconscious scratching while the cell was on the arm. At intervals the cell was removed, the lice examined, and the patient in some instances allowed to scratch the area. The incubative period varied from 16-26 days, being longer than in blood inoculation. Apparently the transmission of the disease is not necessarily direct and mechanical.

Summary.

The organism causing trench fever is present in the plasma of the blood and up to the present time it has not been shown to be filterable. The disease is transmitted naturally by the louse and apparently this is the important and common means of transmission. Further experiments are in progress.

P. W. B-S.

COUVY (L.) & DUJARRIC DE LA RIVIÈRE (R.). *Note sur l'étiologie de la fièvre des tranchées.*—*C. R. Soc. Biol.* 1918. Jan. 12. Vol. 81 No. 1. pp. 22-28. With 6 figs.

Trench fever, known also as intermittent fever of obscure origin, "P. U. O.," periodic one day fever, *Febris Quintana*, *Febris Wolhynica*, etc., is now recognised as a distinct disease found over a wide geographical area, but mostly in the war zones.

In 1915, MACNEE and others proved that it was transmissible by blood inoculation, but the etiological factor was not determined. A spirochaete was suspected by WERNER and KORBSCHE and found in the blood by RIEMER in 1917, who cultivated it in inactivated human serum, and proved its pathogenic action. PATTERSON (S. W.) also found the spirochaete five times in the urine of soldiers suffering from trench fever. In 1916 COUVY commenced his work on this spirochaete and with his co-author has examined a great number of these

cases. In 1916, a guinea pig was inoculated with the blood of a patient. After death its liver contained the same spirochaete as was described by PERRIT. This observation has since been confirmed on a German prisoner who was suffering from typical trench fever. The spirochaete was found in his blood once and in the urine twice and the blood taken during a pyrexial period was found to be infective to a guinea pig. Two varieties of the spirochaete are found. In the peripheral human blood and in the blood of the guinea pig it appears as a short motile body $4-7\mu$ long with few curves, but it is very scarce and very difficult to find. In smears from the liver and kidneys of guinea pigs inoculated with the blood of the diseased men the forms were longer, $10-12\mu$ with three or four curves, but terminal spherules (as seen in *Sp. ictero-haemorrhagiae*) or flagella have not been observed. This spirochaete is not so delicate as *T. pallidum*, and is less robust than *Sp. obermeiri*, the long forms being very like those found in "Sodoku." It stains well with Giemsa but is shown most satisfactorily with silver impregnation methods (FONTANA). The name of *Sp. gallica* is suggested for this form. The inoculated guinea pig frequently recovers, but careful observation shows that a fever analogous to that seen in man is produced.

The charts given illustrate the spike-like character so commonly seen in man. The spirochaetes are only found in the blood of the animal during these pyrexial periods, a character also noted in the human infections. The best results are obtained by the following procedure. At the time of a febrile attack in the guinea pig, blood from the heart is taken and inoculated into fresh animals, guinea pigs or mice. At the subsequent pyrexial period the animal is killed and the liver and kidneys are examined. These will show the spirochaetes.

The pathogenic action of these spirochaetes differs from that of the *Sp. ictero-haemorrhagiae* in not producing jaundice, and is rarely so fatal. The immunity reactions too are distinct, in that an animal immunised with the trench fever spirochaete is not protected from the ictero-haemorrhagica spirochaete, as shown by experiments carried out by PERRIT at the Pasteur Institute.

[These blood spirochaetes are often extraordinarily difficult to demonstrate. The reviewer has with the *Sp. ictero-haemorrhagiae* frequently failed to find them in stained films when they were definitely present by dark ground illumination, and has failed to find them by this latter method when the inoculated blood gave rise to the disease and death of the animal in six days; therefore negative results of microscopical examinations are of little value from an etiological point of view.]

P. W. B-S.

DENGUE AND PAPPATACI FEVER.

CLELAND (J. Burton) & BRADLEY (Burton), assisted in the Inoculation experiments by McDONALD (W.). **Dengue Fever in Australia. Its History and Clinical Course, its Experimental Transmission by *Stegomyia fasciata*, and the Results of Inoculation and other Experiments.**—*Jl. Hygiene*. 1918. Jan. Vol. 16. No. 4. pp. 317–418. With 9 charts.

Preliminary reports of the experiments of the authors on the endemic outbreaks of a dengue-like disease in Australia have been recorded in this *Bulletin*.

In the present paper the work has been fully recorded and the details of the cases are given with charts illustrating the fever curves of the inoculated cases. From the records obtained there is no doubt that dengue has been introduced into Australia and has appeared in endemic form since 1885. The disease agrees in its symptomatology with text-book descriptions but the relative and often slow pulse rate is here a very marked feature. It is however very probable that, under the term dengue, more than one disease may have been included. It is shown that the distribution of endemic dengue in Australia is the same as that of *Stegomyia fasciata* and that this mosquito when caught in an infected area, where it is known to have fed upon dengue patients during the first two days of the illness, and transported to a non-dengue district can infect four out of seven persons bitten; also that blood taken from these infected cases can produce the disease when injected into non-immune persons. The incubative period of these four cases varied between five and nine-and-a-half days, counting from the date of biting to the definite onset of the disease, and no infection occurred from these cases apart from inoculation methods, neither was it found possible to transmit the disease by *Culex fatigans*. When the fever was transmitted by inoculation the symptoms were typical in every way of the naturally contracted cases.

Further experiments showed that the virus is present in the blood as a whole but what the virus is has not been determined. The serum of clotted infected blood may contain the virus and in one case out of three injections of washed corpuscles gave a positive result. The virus is also present in the fluid part of citrated infected blood and in filtrates of infected serum that had passed through a Pasteur-Chamberland candle. There was evidence to show that the virus is present in the blood on the second and third day of the disease and may possibly be found up to the eighth, but is certainly not present on the fourteenth day after the onset. The infected blood if kept in a cool place may remain infective for at least seven days.

The authors were able by sub-inoculations from individual to individual to pass the disease on to the fourth generation, but it could not be conveyed by the application of infected serum to a scarified area. Immunity appears to be complete twenty-four days after recovery from a typical attack. From these data it appears certain that the virus in Australia is conveyed by *Stegomyia fasciata*, and that it undergoes some development in this insect; the disease and its transmission show many points of resemblance to Yellow Fever.

P. W. B-S.

KOIZUMI (T.), YAMAGUCHI (K.) & TONOMURA (K.). [An Epidemiological Study of Dengue Fever.]—*Taiwan Igakukai Zasshi (Jl. Formosa Med. Soc.)*. 1917. June 28 & July 28. Nos. 176 & 177. pp. 369-392; 432-463.

[From Review by R. G. MILLS.]

Dengue has apparently been epidemic in Formosa since 1872, but was never so widespread as in 1915, when it affected full half of the inhabitants. This epidemic began in a port of southern Formosa which had direct trade with the South Sea Islands. The disease spread rapidly and affected the Japanese population far more heavily than the natives. The following important epidemiological facts were noted.

(1). There was a definite seasonal incidence, the disease being most virulent in the summer.

(2). The denser centres of the population suffered most and the routes of communication were the lines on which it spread.

(3). Low lands and coast towns were most affected.

(4). The worst part of the epidemic coincided with the maximum development of mosquitoes.

Clinically the disease was typical, and a definite incubative period of three days was noted. In the primary eruption stage, besides the ordinary flushed face a "sunburn" appearance of the ulnar side of the hands is described. Epistaxis was common. In the second febrile period the onset of the pyrexia was less abrupt and in 3.5 per cent. of cases the eruption was as large as millet seeds. Albuminuria was present in 15 per cent. of the cases, headache was a marked symptom in 93 per cent., pains in the loins in 69 per cent., and eyeball pain in 27 per cent. It is noted that the pains generally were not severe enough to be described as bone breaking. During convalescence the pulse rate was always low, perhaps as low as 44-48, and though the joints were painful, in no case was an arthritis or synovitis found. Examination of the blood never revealed parasites, but the white cells were generally decreased in number. Only one death was reported out of 6,000 cases, and this case was suffering from organic heart disease.

The authors report an experimental study of the same epidemic. They found that the injection of small amounts of defibrinated blood taken from dengue patients gave negative results with dogs, rabbits, white mice, and the long tailed Formosan monkey. Guinea pigs generally died after 7-36 days. Blood taken from the hearts of these animals, which had been inoculated fifteen days previously, and then injected into other pigs caused their death in 5-19 days when inoculated intra-peritoneally or subcutaneously, but death was delayed to the 28th-34th day if given intravenously [a surprising result]. Third transference was negative in every case. In experiments with men it was noted that a certain number were naturally immune, so that negative results were not necessarily conclusive, but the following positive experiments are recorded.

(1). Five mil. of blood from a 3 day ill patient was incubated for 10 minutes, centrifuged, and the clear serum injected; infection occurred in 5 days, 22 hours.

(2). Blood removed from 2nd to 6th day was effective but not that taken on the 8th day (one case possibly a naturally immune).

The minimum amount of blood which was found to be infective was 0·00005 mil. The average length of the incubative period was 130 hours. In two cases, the blood of patients diluted with 3-4 volumes of saline and kept at room temperature for five hours and then injected into men gave positive results, but when kept for 5 days in the ice chest the result was negative. With the injection of filtered serum the authors had one successful case out of four, but they state that the other three men were later found to be naturally immune.

Examination of the infected blood by staining and dark ground illumination gave no definite information. With regard to mosquito transference, a large number of experiments were made, but positive results were only obtained with *Stegomyia scutellaris* and *Desvoidea obturbans*, never with *Culex fatigans*. The authors however point out that as the volunteers were not under observation and confinement before the experiment began, the mosquito theory of transmission, though strengthened, is not absolutely proved.

P. W. B-S.

HANABUSA (S.). [Dengue Epidemic in Formosa among Soldiers.]—*Gunidan Zasshi (Jl. Milit. Surg. of Japan)*. 1917. July 20. No. 70. pp. 578-594.

[From Review by R. G. MILLS.]

In a regiment of 482 engineers there were 86 cases of dengue, giving an incidence rate of 18·2, with 1,006 days loss of service. The epidemic occurred during January and February when mosquitoes were not found. In 81 per cent the diazo reaction was present in the urine. The diazo reaction was closely connected with the appearance of the exanthem, reached its acme at the same time, and disappeared when it faded. The following table is of interest:—

Day.	Average temp.		Exanthem per cent.	Arthralgia per cent.	Diazo reaction. per cent.
	a.m.	p.m.			
1st	39·3	38·8	21	29·1	2·1
2nd	38·3	38·8	14·5	48·7	22·9
3rd	37·8	37·8	48·7	47·9	52·1
4th	37·4	37·4	60·4	37·5	58·3
5th	37·1	37·1	50·0	22·9	56·2
6th	36·7	37·0	37·5	18·7	35·4
7th	36·6	36·9	23·1	17·9	12·8
8th	36·6	37·0	3·4	7·2	3·4
9th	36·7	37·0	4·0	4·0	8·0
10th	37·0	37·0	4·0	0·0	5·0

P. W. B-S.

McCULLOCH (C. C.). *Dengue Fever.*—*New Orleans Med. & Surg. Jl.* 1918. Mar. Vol. 70. No. 9. pp. 694-706.

The author describes very thoroughly the disease known at the present time as dengue. It would appear that there has been a considerable change in type since it was first recognised, in that now the pains

tend to be much less marked, the term "breakbone fever" being rarely applicable. In referring to the diagnosis the only important diseases noted are yellow fever and measles, but to this, phlebotomus fever might have been added. No new facts are given.

P. W. B-S.

ADRIEN (Charles). *Dengue Méditerranéenne observée à l'Île Rouad (Syrie). Étude des conditions locales de reproduction des insectes dans cette île.*—*Arch. Méd. et Pharm. Nav.* 1918. Apr. Vol. 105. No. 4. pp. 275-307.

In 1915 about 100 marines were landed on the Isle of Rouad (Syria) from the "Jeanne d'Arc." A fever of short duration was endemic there, most prevalent in the summer and autumn months, but present to a less extent throughout the year. From Sept. to Jan. there was 47 cases, and a tentative diagnosis of paludism was made. In the summer 74 cases were notified in two months, of which 57 were in July. A very full clinical description is given with a long discussion as to the differential diagnosis from paludism, dengue, and three day fever, but from the report there is little doubt that the author was dealing with true phlebotomus fever: a short incubation, sudden onset, high fever of three days duration, congestion of face, eyeball pain, muscular aching, and constipation, with benign character and rare relapses. Dengue is said to exist in Syria and the epidemic which occurred at Rouad was believed by BARTET to be the same as that observed at Jeddah, called "Dengue sine eruptione." The differentiating characters of the Rouad fever from dengue were, the rarity of a secondary rise of temperature, and the absence of eruption (only 3 cases). The author considered that it was not typical dengue but possibly a modified form, though in many cases the symptoms were nearly identical with those of three day fever, differing however from the classical account of this by the not infrequent presence of late diarrhoea, and the absence of the marked prostration during convalescence, which has been so commonly described. Instead, there was a very rapid recovery and a quick return to duty. Mosquitoes, *Stegomyia fasciata* and *Culex* sp., were very abundant, particularly in those seasons when the fever had its highest incidence, and *Phlebotomus perniciosus* was also present. The author follows the example of SARRAILHÉ and uses the term "Mediterranean dengue" to describe the disease, which geographically and etiologically is an unsatisfactory name, for he considers the phlebotomus to be the "carrier," mosquitoes only acting as possible transmitters. Examination showed that breeding places for both mosquitoes and sand-flies were plentiful in the island and that the anti-mosquito measures taken gave satisfactory results in the reduction of the cases of the fever, but constant renewal from the mainland takes place.

[The similarity of the clinical type of the fever of Rouad, and that described by LAMBERT from Lemnos as phlebotomus fever is very striking, especially in the rapid recovery following the fall of the temperature.]

P. W. B-S.

LAMBERT (J.). *Phlebotomus Fever in Lemnos.*—*Jl. Roy. Nav. Med. Serv.* 1918. Apr. Vol. 4. No. 2. pp. 144–157. With 3 charts.

Phlebotomus fever is during the summer months a very prevalent disease in the Eastern Mediterranean. The observations here recorded were made from cases treated on board the R.N. Hospital Ship "Rewa" at Mudros Harbour, all the cases during June, July, and August being received in this ship. At Lemnos the disease is found from May to September, but is most common in June, July and August, when the weather is hottest and the flies most abundant. The *P. papatasi* was found to be the most frequent form.

Their breeding places in the vicinity of Mudros are ideal, native houses of stone roughly cemented, with the presence of much rubble and loose stone; the foreshore of the harbour close to the Naval and Marine Camps is composed of rough stones and in places there is an artificial stone embankment full of dark damp crevices close to the water's edge. The camps are on the slope of a small hill of rough conformation with stray gullies affording admirable shelter for the larval stages of the sand fly. The camps chiefly affected were the Naval camp on the site of the old French Headquarters, and a French Hospital in 1915, the N. T. O. camp close to the foreshore, and the Marine camp along the foreshore.

It is noted that outlying camps provided only six cases out of the 237, but these numbers are probably an under estimate of the total cases. The men in the camp were all very susceptible, being newly arrived and young. The Marines from the East Mudros Camp suffered very heavily; they gave 110 cases out of the total 237; probably about 50 per cent. were attacked; those on board ship in the harbour remained practically free.

The flies are in evidence when it is calm or with only gentle breezes. In the hot sultry evenings they are most numerous. The incubation period is from two to four days and the development of the virus is said to take six to eight days; an interval therefore of eight to twelve days after a calm period would probably elapse before cases were admitted, and this was found to be generally true. The average daily temperature varied between 76 and 83 degrees.

The author describes fully the clinical symptoms, which are too well known to require special mention, but he points out that recurrences were fairly common, giving rise to a double fever curve. In 29 per cent. the duration of the fever was four days, and in 31 per cent., 5 days; in only 14 per cent. was it three days. Second attacks were uncommon, about 11 per cent., so that in 90 per cent. immunity is acquired against re-infections in the same season. The debilitating after effects commonly described as following attacks of sandfly fever were not noted in this epidemic, as recovery was very rapid, the patients being generally fit for duty in seven days. The diagnosis had to be made from malaria, dengue, influenza, and sunstroke.

P. W. B-S.

DELMEGE (J. A.) & STADDON (C. S.). *Clinical Notes on Phlebotomus Fever.*—*Brit. Med. Jl.* 1918. Apr. 6. pp. 396–397. With 5 charts.

The observations were made in Macedonia. The *Phlebotomus papatasi* were very numerous and bit both day and night, the puncture being followed by a small irritating papule. The incubative period was from four to six days, and the onset was almost invariably sudden.

The authors found that reinfections were comparatively common, that a post-critical rise in the temperature was frequent, that there was a great variability in the amount of conjunctival injection, and that in the great majority of cases the temperature fell by crisis. In some cases they found a subsequent irregular fever which might last for ten days.

P. W. B-S.

HARTLEY (J. A.). *An Outbreak of Phlebotomus Fever.*—*Brit. Med. J.* 1918. Apr. 6. p. 395.

A very localised but severe epidemic of phlebotomus fever occurred in mid-Egypt in the summer of 1917. It affected 86 per cent. of the total strength. The unit moved to a new camp, but after certain preventive measures had been taken a guard was detailed for the original post, and in four days the disease reappeared and attacked all. The site was an elevated spot near a pool of stagnant water. This was "oiled" but "midges" with hairy bodies were very abundant and passed through the mosquito nets. The midges were found on walls and in rubble. The incubative period of the fever was four to seven days, and the disease, marked by a very sudden onset, was quite characteristic.

P. W. B-S.

BLAU (Paul). *Ueber Pappataccifieber.*—*Wien. Klin. Woch.* 1918. Jan. Vol. 31. No. 3. pp. 89-90.

The author states that in the summer months of 1916 and 1917 he treated some six hundred cases of phlebotomus fever in the Mediterranean area. The greater number of these cases were seen in June and July. Some races were more affected than others, but he never observed any absolute immunity. The *P. papatasi* was the most common species and the bites were generally on the face, hands and feet.

He describes the clinical symptoms and draws special attention to the splenic enlargement; in 90 per cent. this could be made out by percussion on the first day of the fever, and the spleen could be palpated on the second. He notes relapses in 10 cases from the 4th to 10th day, when enlargement of the spleen and all the original symptoms recurred. The other objective signs were, peculiar colour of the skin, conjunctivitis, herpes, and tachycardia. Generally speaking the symptoms and course agree with previously described epidemics.

P. W. B-S.

BRACK. *Pappatacimücken und Pappatacierkrankungen.* [Sand Flies and Phlebotomus Fever.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. Dec. Vol. 21. No. 23-24. pp. 381-398. With 3 charts.

The author states that the paper is written for those who have no knowledge of the disease and is derived from observations made while in Turkey, where cases were very prevalent.

He draws attention to the importance of placing camps in airy positions, as the sand flies do not appear to like wind. The floors

should be of concrete, and fine gauze used for protection of doors, etc. Every morning all flies should be sought for and killed. With regard to symptoms, he states that only one third of the cases had the so-called pathognomonic conjunctivitis. Constipation is common but occasionally diarrhoeal and dysenteric stools are passed; painful micturition was often noticed and mania has been observed. Relapses of fever were found in 33 per cent. Generally an immunity is established; he however saw some few Germans and Turks who had attacks in two consecutive years. He makes the interesting note that in the fever season several horses were attacked with a fever which lasted two days.

P. W. B-S.

RAT BITE FEVER.

Low (George C.) & COCKIN (R. P.). **A Case of Rat-Bite Fever Treated Successfully by Injections of Novarsenobillon.**—*Brit. Med. J.* 1918. Feb. 16. pp. 203-204.

The authors describe a case of rat bite fever in a man aged 25 who was bitten on the back of the right forearm by a rat in East Africa. Seven days later a local swelling appeared followed by fever and a rash all over the body, the initial injury suppurated, and on the twentieth day there were severe bone and joint pains. These improved but there were nineteen relapses in a year. As he was also infected with malaria it was impossible to say to which the pyrexial attacks were due. There was no history of syphilis. He was admitted to hospital and in Dec., 1917 he had a typical attack of rat bite fever with rash, glandular enlargement, and pains. No malarial parasites, trypanosomes or spirochaetes were present in the blood. Three injections of novarsenobillon (0.4, 0.6, 0.9 gm.) were given and the patient made a good recovery, but he was directed to take quinine, grs. 5 twice a day, for three months to combat the malaria.

The short incubation period, suppuration of the primary lesion, and co-existence of malaria with the presence of a positive Wassermann reaction are the chief points of interest.

P. W. B-S.

DOUGLAS (S. R.), COLEBROOK (L.) & FLEMING (A.). **A Case of Rat-Bite Fever.**—*Lancet.* 1918. Feb. 16. pp. 253-255. With 1 chart.

The authors describe an interesting case of rat bite fever in which very careful bacteriological examinations were made. The patient was a healthy farmer. The initial injury healed rapidly. Between five and eight weeks after a tender swelling appeared on the right forearm and he felt ill with pain in right side of the chest and cough, and was at first treated as an early case of phthisis. Intermittent attacks of pyrexia followed and he was transferred to St. Mary's Hospital. Enlarged lymphatic glands were found in both axillae; these became more swollen at each pyrexial attack which occurred at about three day intervals, the temperature rising as high as 104° F. Pain in the limbs was usual and on one occasion there was a macular rash similar to that seen in rat bite fever. Examination of the blood showed a polynuclear leucocytosis but no parasites could be demonstrated. Blood cultures were also negative. One of the axillary glands was removed and from this aerobically a staphylococcus and a diphtheroid bacillus were grown; anaerobically a long Gram-positive streptococcus was isolated which by inoculation experiments proved to be *Streptococcus pyogenes*. The patient's serum agglutinated emulsions of this organism in dilutions of 1 in 160. A vaccine was prepared with this streptococcus, and when used caused an immediate cessation of the febrile attacks and other symptoms. The association of a polynuclear leucocytosis and streptococcal infection lead the authors to believe that the condition known as rat bite fever is a bacterial disease, and that Streptococci will probably be found to be one of the most common causes.

[This conclusion is in distinct opposition to the large amount of evidence that has lately been published on the spirochate origin of the disease, and the possibility of the streptococcus isolated being a secondary infection must be considered.]

P. W. B-S.

RAMOND (Félix) & LÉVY-BRUHL. *Un nouveau cas de Sodoku.*—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Nov. 15. 3 Ser. Vol. 33. No. 29-30. pp. 1086-1089. With 1 chart.

This is said to be the third reported case in France during the war. An artillery man aged 41 was bitten on the right hand while with his battery. Local symptoms and fever appeared twelve days later. Twenty-eight days after the bite fever and a generalised eruption with other constitutional signs appeared. Cultures and inoculations were made but the results were nil. The author notes that had the case been seen in the constitutionally infected stage only and no history of the bite given, the diagnosis would probably have been trench fever as the paroxysm came on about every sixth day and lasted generally 48 hours. The eruption was however abundant and is not a sign of trench fever. The authors state that the likeness of the two diseases is considerable, and it is possible that the rats, which are generally very abundant, may convey the specific organism of both Sodoku and trench fever and that these may be identical diseases.

[The etiological researches which have been made on the two diseases do not favour this theory.]

P. W. B-S.

MARTINOTTI (Leonardo). *Contribuzione allo studio del Sodoku.*—*Giorn. Ital. d. Malattie Ven. e d. Pelle.* 1917. June 20. Vol. 58. Year 52. No. 2. pp. 116-135. With 1 plate.

The case was that of a woman bitten on the finger by a rat. After seven days there was some pain at the site of injury and on the fifteenth day after the bite the constitutional symptoms appeared. Cultural and inoculation experiments gave negative results and treatment with neo-salvarsan brought about a cure. As the cases are very rare in Italy it is fully described, indeed, so fully that the fact that the husband had suffered from haemorrhoids is given. The remainder of the paper is a resumé of our knowledge of the disease obtained from all sources, but no new facts are brought forward.

P. W. B-S.

GRENET (H.) & LEHUCHER. *Quelques cas de Sodoku.*—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1918. Feb. 7. 3 Ser. Vol. 34. No. 3-4. pp. 73-81. With 4 charts.

The authors are convinced that cases of rat bite fever are more common in France than is generally believed. They describe shortly two cases diagnosed retrospectively and two in detail which were under their care. These were typical but very prolonged. It is therefore rather surprising to note that salvarsan preparations were

not employed to cut short the disease. The relapses at fairly regular intervals, frequently five days, extended through several months, giving a similar chart to that seen in cases of "trench fever."

Laboratory examinations gave no positive results either with culture or by direct preparations, but it is not stated if dark ground illumination was used.

P. W. B-S.

D'HALLUIN (P.) & FIÉVEZ (J.). *Un cas de Sodoku subaigu.—Paris Méd.* 1918. Mar 23. Vol. 8. No. 12. pp. 234-236. With 1 chart.

A woman from Lagny was in Nov., 1916 bitten on the hand by a rat. She did not come under the author's observation until March, 1917. The history of a rat bite followed by a non-suppurative adenitis with febrile attacks during $3\frac{1}{2}$ months without visceral lesions made the diagnosis fairly sure. The subsequent course showed a persistent intermittent fever with regular weekly paroxysms. These gradually passed off and in July the patient was quite well.

The chief points noticed by the authors are (1) the regularity of the relapses, which might correspond with the duration of the evolution of the parasite [none observed]. (2) An urticarial eruption which is unusual, (the patient had received a serum treatment). (3) The decline of the disease under arsenical treatment.

P. W. B-S.

CAVINA (Giovanni). *Un cas di Sodòku in un soldato.—Morgagni.* Pt. I. Archivio. 1917. Aug. 31. Vol. 59. No. 8. pp. 258-264. With 1 chart.

The author reports in detail a case of rat bite fever in a soldier from the Isonzo region who was bitten on the finger in his barrack room, while asleep. The initial lesion was cauterised and healed, but after a period of sixteen days the wound broke down and became very painful, attended with lymphangitis and fever. The finger was amputated. There were four pyrexial attacks; in the second and third a marked papular eruption occurred. The constitutional symptoms were severe but the case made a good recovery under salvarsan treatment.

P. W. B-S.

SANO (T.). [Rat Bite Disease (?). Case Report.]—*Iji Shimibun. (Medical News).* 1917. Sept. 10. No. 981. pp. 1153-1160.

[From Review by R. G. MILLS.]

The case reported is that of an infant who had never been bitten by a rat but had been scratched by a cat at least three times. The lymph glands became swollen and fever developed followed by an urticarial eruption over the body with the usual symptoms of rat bite disease. Agglutination tests confirmed this diagnosis and one salvarsan injection brought about a complete cure.

P. W. B-S.

BORELLI (Edoardo). *Le iniezioni mercuriali nella cura del Sodoku.* [Mercurial Injections in the Treatment of Rat-Bite Disease.]—*Policlinico. Sez. Prat.* 1918. Jan. 13. Vol. 25. No. 2. pp. 25-30. With 1 chart.

The case of a boy aged 13 years, who was bitten by a rat on the back of the right hand. After an incubation-period of 15 days, the usual symptoms of rat-bite disease developed on September 23rd, 1916. Treatment was initiated by the local application of warm compresses of corrosive-sublimate lotion to the affected hand and arm, but these not proving sufficient, on the 4th October intra-muscular injections of one centigramme of corrosive-sublimate were made daily into the muscles of the buttock and continued until the 10th of the same month. Under this treatment the temperature fell to normal by the latter date and did not rise again, while the general symptoms improved at once remarkably. The case was watched until the 31st December, without any relapse occurring. The prompt cure is attributed to the injections.

J. B. N.

COLES (Alfred C.). *Rat-Bite Fever.* [Correspondence.]—*Lancet.* 1918. Mar. 2. p. 350.

Referring to DOUGLAS' paper the author states that it is conceivable that fevers clinically resembling rat bite fever may be due to numerous different organisms, spirochaeta, streptothrix or streptococcus, but the work of FUTAKI and others cannot be set aside. He states that for the past year he has been employed upon a careful study of the kidneys of 100 rats for spirochaetes and has found the *Sp. icterohaemorrhagiae* in 9 and in one a spirochaete morphologically like that of *Sp. morsus muris* of rat bite fever.

P. W. B-S.

ROCKY MOUNTAIN SPOTTED FEVER.

WOLBACH (S. B.). **The Etiology and Pathology of Rocky Mountain Spotted Fever. (Third Preliminary Report.) The Occurrence of the Parasite and the Pathology of the Disease in Man. Additional Notes on the Parasite.**—*Jl. Med. Res.* 1918. Jan. Vol. 37. No. 3. (New Ser. Vol. 32. No. 3.) pp. 499–508.

After giving a resumé of previous work, the author gives details of the examination of tissues taken post mortem from two cases, and the affected skin in a third, with much animal pathological material. The lesions in man and animals were specifically the same. He notes that the tissues of the scrotum of the two male cases were markedly swollen and infiltrated with blood. The gross changes in both man and animals are haemorrhagic lesions in genitalia and enlarged lymph nodes, with a large firm spleen. Microscopically there were lesions of the arteries and veins of the skin and subcutaneous tissues, and also of the pampiniform plexus. He summarises the results found thus :

In Rocky Mountain spotted fever the lesions are restricted to the blood vessels of the skin and genitalia ; there is an endangitis characterised by endothelial cell proliferation with local necrosis of endothelium and the smooth muscle fibres. The reactions to the toxic properties of the parasite are shown by a general increase of the phagocytic activity of the endothelial cells, and by an accumulation of similar cells in the lymph nodes and spleen.

The cause of the disease is the minute parasite previously described from guinea pigs and monkeys, and now proved to be constantly present in the blood vessels of man, monkeys, rabbits, and guinea pigs, and in ticks able to transmit the disease. The parasite shows peculiar staining reactions and is localised in the endothelial cells and smooth muscle fibres. It shows intranuclear multiplication in ticks and has a varied morphology. In his opinion these characters indicate a new form of micro-organism, not an ordinary bacterium, but one not having a complicated life cycle as in protozoa. He states that the disease in susceptible animals exactly duplicates that of man, irrespective of transmission by ticks or direct inoculation.

P. W. B-S.

PARKER (R. R.). **Some Results of Two Years' Investigations of the Rocky Mountain Spotted Fever Tick in Eastern Montana.**—*Jl. Econom. Entom.* 1918. Apr. Vol. 11. No. 2. pp. 189–194.

This study showed that the infective ticks spread widely and in Montana are in most districts only numerous at irregular periods. In the year 1915 they were generally abundant. In small local areas they appeared to depend upon peculiar changes in the vegetation. From an examination of 1,700 animals of thirty species the most important hosts of the adult ticks were found to be jack rabbits and deer mice. Under favourable conditions field mice were also largely

infected. It was noted from observations of two seasons that an abundance of ticks and of jack rabbits preceded the occurrence of cases of fever. In prairie country the rabbits thrive best and therefore are generally the hosts of the ticks. In the hilly regions the deer mice are most commonly found confined to rocky slopes between the valleys and hills, and here the ticks are also most abundant. These points are most important and interesting.

P. W. B-S.

TYPHUS.

NUTTALL (George H. F.). *The Part played by *Pediculus humanus* in the Causation of Disease.*—*Parasitology*. 1917. Nov. Vol. 10. No. 1. pp. 43-79. With 1 plate.

The part of this paper which deals with typhus is thus summarised by the author—

"The earlier evidence which is cited regarding the epidemiology of typhus is all in accord with the discoveries proving that *P. humanus* conveys the disease and is the sole agent in its spread.

"The geographical distribution of typhus is more restricted than that of *P. humanus*, the disease being confined essentially to cool and temperate climates.

"The virus of typhus occurs in the blood of affected individuals. Blood collected on the 3-10th day of the attack has been found to be virulent. The evidence as to the nature of the virus is still contradictory. The virus can be maintained in undiminished virulence by passage through animals (chimpanzee, monkey, guinea-pig).

"Infection occurs through the bite of infective lice or through such lice being crushed upon the skin when the latter is scratched. Lice which have sucked blood containing the virus are capable of producing infection during 7-11 days after they have infected themselves. If such lice are crushed 9-10 days after an infective feed, or if their faeces are collected 3-6 days after they have fed on infective blood, their contents and faeces respectively are capable of producing infection if placed upon the excoriated skin. It has not been determined how long lice remain infective when once contaminated. The evidence regarding the hereditary transmission of the virus in the louse is contradictory.

"Lice are invariably present in connection with typhus outbreaks. The destruction of lice upon a typhus patient renders him innocuous. The prophylaxis of typhus consists in louse destruction. Bedbugs and fleas do not convey the disease.

"Recent experience is in agreement with observations, dating from 1739, in respect to the occurrence of typhus and relapsing fever side by side in epidemic form."

R. P. Cockin.

NETTER (Arnold) & BLAIZOT (Ludovic). i. *Note sur quelques cas de typhus exanthématique à Paris. Difficulté du diagnostic par un médecin non prévenu. Efficacité des mesures préventives. Existence d'un typhus endémique bénin.*—*Bull. Acad. de Méd.* 1918. Jan 29. 3 Ser. Vol. 79. Year 82. No. 4. pp. 90-108. With 8 charts.

ii. *Identification des virus exanthématique parisien et africain, au moyen des immunisations croisées.*—*C.R. Soc. Biol.* 1918. Mar. 9. Vol. 81. No. 5. pp. 265-268. With 5 charts.

i. In the first of the above papers, Netter and Blaizot describe a small epidemic of typhus fever which occurred in a family, employed as rag pickers, in Paris. The symptoms and course of the disease, as described by the authors, are typical of the infection, although the cases which came under their notice in the first instance were atypical and the diagnosis was for some time in doubt. The authors are of the opinion that they have had to deal with an attenuated form of the typhus virus such as is met with in the so-called Brill's disease. They were successful in transmitting the disease to guinea-pigs and

recognised all the symptoms of typhus fever usually met with in those animals. All six cases, who are described as being intensely verminous, recovered.

ii. In the second paper it is stated that guinea pigs rendered immune to the Parisian strain of the typhus virus are immune to the Tunisian strain and vice versa.

R. P. C.

MURATET (L.). *A propos de quelques cas de typhus exanthématique. Notes pratiques.*—*Presse Méd.* 1918. Feb. 7. Vol. 26. No. 8. pp. 70–71.

Commenting on NETTER and BLAIZOT's paper [see above] on six cases of typhus fever in Paris, the author, whilst considering those cases of little consequence, quite realises the danger of the spread of an epidemic of this nature at the present time. He gives a description of the clinical features of the disease and of its transmission, and a synopsis of the work done by his fellow-countrymen—NICOLLE, BLAIZOT and others.

He adds some interesting figures regarding the incidence of typhus during the present war. These are briefly stated thus:—

Austro-Hungary: About 1,500 cases per month, during the first year of the war.

Serbia: Typhus introduced by Austrian prisoners of whom 50 per cent. [of 70,000] succumbed to this disease. It is estimated that 135,000 deaths have resulted from this disease during the present war.

Salonica: 51 cases in 1915, 31 deaths—other cases occurred in 1916.

Egypt: In 1914 there were 9,350 cases with 2,634 deaths and in 1915 there were 14,505 cases with 3,398 deaths. No cases have been recorded in France amongst the French and British troops and the cases recorded by NETTER and BLAIZOT are the only ones from amongst the civilian population since 1914.

R. P. C.

STARK (Joseph). *A Series of Cases of Typhus Fever.*—*Brit. Med. Jl.* 1918. Feb. 9. p. 175.

In this note, Stark reports from West Lothian seven isolated cases of typhus fever which occurred in a mining village remote from any seaport, military station or other possible focus of infection. He states that the virus became reinforced as the epidemic progressed and that the characteristic features of typhus were only observed in the later cases. All the cases showed sudden onset, fever, early and marked prostration, dry and dirty tongue, constipation and cardiac failure. The exanthem, which was present in all the cases of the series, was only typical in the last four. Epistaxis and retention of urine were observed in two cases and broncho-pneumonia in one case, which terminated fatally. The fever terminated by crisis on the 12th–14th day in six of the cases.

[The condition of the patients with regard to vermin is not stated.]

R. P. C.

MARAÑÓN (G.). *Una epidemia di tífus exantemático (Madrid, 1916) con algunas consideraciones sobre el estado actual de la clínica y profilaxia de esta enfermedad.* [An Epidemic of Typhus in Madrid, 1916, with Remarks on the Present State of the Clinical Knowledge and Prophylaxis of the Disease.]—*Siglo Med.* 1917. Oct. 13 & 27. Vol. 64. Nos. 3331 & 3333. pp. 766-768; 808-812.

There have been 5 epidemics of typhus in Madrid during the last 15 years, namely in 1903, 1906, 1909, 1913 and 1916. The triennial periodicity of the outbreaks is not easy to explain, says the author of the present paper. The last epidemic comprised 143 cases, of which 53 were males and 90 females, the preponderance of the latter being attributed to the greater opportunities for louse-infection afforded by the long hair of the women and girls. The mean mortality of these epidemics has been the usual one, of about 15 per cent. The present epidemic commenced in unusually cold weather in the month of April, and continued until the end of June. As in previous epidemics, the disease broke out in shelters provided for the lowest class of idle and indigent poor. Profiting by the experience and knowledge gained elsewhere of recent years as to the mode of infection and the methods of prevention indicated in typhus fever, the authorities of Madrid were able to terminate the 1916 epidemic much more quickly than previous ones.

J. B. Nias.

JORGE (Ricardo). *A epidemia de tifo exantemático.*—*Med. Contemporanea.* 1918. Mar. 3. Vol. 36. No. 9. pp. 65-72.

Notes on a recent epidemic of typhus fever at Oporto. Between December 24th 1917, and the date of writing (about 3 months) 1,109 cases, resulting in 96 deaths, had occurred in a population of 200,000 persons. The author states that Portugal is never wholly free from typhus, though from defective certification of the cause of death the actual amount cannot be stated with any certainty. The annual number of deaths certified between 1901 and 1915 ranged from 21 to 65. The disease is seen mostly in the fishing villages on the coast, and in hilly regions in the interior, among the peasants.

J. B. N.

DE AZEVEDO (Antonio). *Sobre o typho exanthematico em Lisboa.* [Typhus in Lisbon.]—*Med. Contemporanea.* 1918. Mar. 17. Vol. 36. No. 11. pp. 83-86.

Notes on the prevalence of typhus fever in Lisbon. The cases have been of recent years few, no deaths having been registered from the disease between 1861 and 1867, and again between 1908 and 1911. The maximum number of deaths (10) occurred in 1893. The disease seems to coincide with bad seasons in the fishing industry, leading to privation and agglomeration of families.

J. B. N.

SOUBBOTITCH (V.). A Pandemic of Typhus in Serbia in 1914 and 1915.
—*Proc. Roy. Soc. Med.* (Sect. Epidem. & State Med.). 1918.
Feb. Vol. 11. No. 4. pp. 31–37.

The invasion of Serbia in 1914 by the Austrian troops, amongst whom typhus was raging, undoubtedly introduced the disease into the northern part of that country. The mobilisation of the recruits from the Albanian borders, where typhus was previously known to exist, disseminated the disease throughout the southern portion. By January 1915, the disease from these two foci had merged together and had become pandemic, and the whole of Serbia "was flooded with typhus and relapsing fever."

This pandemic raged in full force during January, February and March, began to die down in April and came to an end in June. The incidence in the Serbian army and amongst the Austrian prisoners of war was about 150,000 and the mortality about 30,000. "Doctors in particular were the sufferers. Out of 350 Serbian doctors, 126 succumbed to typhus, the death rate among them being as high as 36 per cent." Relapsing fever was also present in epidemic form and when this disease complicated typhus the death-rate was very high.

Among the civil population the highest mortality occurred. Children, however, were remarkably immune. The chief sufferers are noted to have been debilitated old people, and those suffering from cardiac or renal diseases. The wretched condition of the people, lack of hospital accommodation and equipment and, above all, of adequate hospital staffs made it impossible to cope efficiently with the disease. The author quotes the case of one hospital, which normally accommodated 400 patients, and which, under the conditions obtaining during the pandemic, housed 1,600—more than 1,000 of whom were suffering from typhus. Out of the total staff of 42, only 3 remained free from infection.

Lice swarmed throughout the country and energetic measures were taken to exterminate them and enlighten the population as to the part played by these insects. Railway travelling was restricted, upholstered carriages done away with and the carriages were disinfected and cleansed after each journey. All public vehicles were examined and disinfected, and public places were ordered to be closed for certain hours each day for the purpose of cleansing and disinfection.

Primitive hot-air ovens were everywhere set up for the purpose of disinfecting the soldiers' clothing and, in the opinion of the author, circulating hot air appliances are the best for destroying lice. Colonel Soubbotitch considers that the view that typhus is transmitted by lice is correct, although he states that a colleague who died of typhus declared that he had never been "bitten" by a louse. [The view regarding the louse transmission of typhus is that the virus is introduced through an abrasion of the skin, following the crushing or bite of the insect.]

A large number of cases with surgical complications came under the writer's notice and are recorded as follows:—

"130 cases of parotitis, which in the majority of cases was severe, suppurative, and even gangrenous." . . . In 124 cases I saw gangrene of the toes, the foot and the leg. In one case only was there gangrene of the penis; sometimes there was partial gangrene of the external ear.

In one instance only had I to treat secondary hæmorrhage in consequence of a traumatic aneurism of the femoral artery in a patient on the eighth day."

The paper should be consulted by those desiring further information regarding this pandemic and the heroic conduct of the various medical staffs in their efforts to combat it.

R. P. C.

PETSCHACHER (Ludwig). Eine Fleckfieberepidemie in russischer Kriegsgefangenschaft. [Epidemic of Typhus in a Prisoners' Camp in Russia.]—*Wien. Med. Woch.* 1917. No. 49. pp. 2182-2190.

An account of a severe epidemic of typhus fever which broke out at a War Prisoners' Camp at Stretinsk [Eastern Siberia] in 1915. This disease is stated by Petschacher to be endemic at Stretinsk (as in the whole of Eastern Siberia), a severe epidemic having occurred there amongst the Russian troops during the Russo-Japanese War. The barracks were subsequently used for the purpose of housing emigrants but were eventually closed because of the repeated outbreaks of typhus fever among the emigrants. They remained closed until they were re-opened to receive prisoners in the early part of the present war.

Petschacher relates that typhus quickly broke out amongst the first batch of prisoners and, in the absence of doctors, orderlies, sanitation, means of isolation, drugs, etc. spread rapidly. He states that of 9,000 prisoners, 2,200 sickened of typhus [24 per cent.], whilst among the doctors and orderlies the incidence was even higher. He gives the figures, which, for convenience, are briefly summarised thus :

	No. who suffered from typhus fever	Percentage.	No. who succumbed to the disease.	Percentage.
Doctors	11	65	2	18
Hospital orderlies	—	80-90	—	—
Officers and men	2,200	24	750	34

The epidemic was sharply divided into two parts, the earlier part when no measures existed for isolation, treatment or nursing the sick ; and the second period (subsequent to the visit of the Swedish-American Commission to the camp) when hospital equipment, doctors, nurses, orderlies and drugs were dispatched and better conditions obtained. The death-rate during the first period was about 50 per cent., whilst during the latter it was approximately 20 per cent. The cases are described as "typical" typhus. Enlargement of the spleen was usually perceptible before the appearance of the exanthem, which was usually noted about the fourth day. This latter was copious and could occasionally be observed in early convalescence. The fever ran a typical course and generally terminated by crisis—occasionally by lysis, extending over five days or more. In this latter case, the patients were usually weakly or exhibited symptoms of tuberculosis. Heart failure was common and a large proportion of the deaths were due to this cause. Complications were frequent and the author

attributes these to the lack of good nursing and attention. Convalescents were observed to be very susceptible to other diseases. Drugs were practically unobtainable in the early stages of the epidemic, but, in the very severe cases, aspirin and antipyrin were administered during the height of the fever. Patients so treated are stated to have rarely developed heart symptoms.

With the advent of the hot weather, the epidemic rapidly died down and disappeared. The author states that, although in constant contact with the patients for four months, he himself escaped infection which he attributes to the fact that he rarely harboured lice on his body or clothing. He considers that the louse may have an antipathy to certain persons, possibly on account of their acid perspiration. This observation was also noted in the case of an orderly who enjoyed the same immunity.

R. P. C.

HETSCH (H.). Zusammenfassende Uebersicht. Der heutige Stand unserer Kenntnisse vom Fleckfieber. [Our Present Knowledge of Typhus.]—*Therapie der Gegenwart*. 1917. Sept. & Oct. Vol. 58. Nos. 9 & 10. pp. 329-333; 358-363.

These papers give a general synopsis of the principle features of typhus fever and the means which recent experience has proved of service in the treatment of that disease. The author lays emphasis on the fact that herpes labialis is present in only 6 per cent. of typhus cases. He also calls attention to the cerebro-spinal fluid which he states has no uniform appearance and the examination of which is of no value in the diagnosis of this disease. As complications he gives, amongst others, the following affections of the respiratory organs:—bronchitis, laryngitis, pleurisy, hypostatic pneumonia and gangrene of the lung. Genuine pneumonia is stated to be rare. Mixed infections are stated to be common. With regard to treatment, he states that immune serum taken from convalescent cases gives very variable results, although he considers it of use. In threatening heart failure he recommends energetic digitalis treatment, given intravenously. Camphor and caffeine he states are of great service in the treatment of the heart failure which occurs in the second week of the disease, whilst for great and sudden reduction in the blood pressure he recommends the intravenous administration of 300-1,000 cc. of normal salt solution, to which is added 0.3 gram of caffeine and 5 minims of adrenalin.

R. P. C.

MARTINI (Erich). Das Fleckfieber der Kinder. [Typhus in Children.]—*Deut. Med. Woch.* 1918. Feb. 7. Vol. 44. No. 6. pp. 156-157.

In this paper Martini describes typhus fever in children as observed by him at an isolation camp in the neighbourhood of Wloclawek. The children were of all ages, from infants up to 13 years, and were almost entirely Jews.

In the young children the onset was never accompanied by a rigor and rarely in older children. They complained of pains in the limbs and headache and were dull and stupid. Constipation was the rule.

The temperature rose by steps to its fastigium, which was attained in 36–48 hours. The temperature was maintained for from 9–13 days. The conjunctiva was injected, the tongue characteristic and the pulse rate quickened. Bronchitis was a frequent symptom. The exanthem appeared between the third and sixth day and was usually very scanty and confined to a single part of the body—usually the upper limbs. This was subsequently followed by a fine branny desquamation. The duration of the fever was usually shorter than in adults. The temperature frequently came down by lysis and the pulse rapidly attained its normal rate. The spleen was constantly enlarged—though not perceptibly so—and easily made out by percussion.

As opposed to this malady in adults, insomnia was not a symptom in children, although the temperature frequently rose to 40° C. and over. The children remained in a condition of semi-stupor throughout the whole course of the disease and “heaviness usually persisted after the fall of the fever.” The appetite soon returns, although it is never so ravenous as after typhoid. The children are extremely wasted at the end of the fever—remarkably so for an illness of so short a duration. No occasion arose for the use of digitalis, camphor, etc.—but purgatives were frequently needed. The diagnosis, in Martini’s cases, depended upon the typical temperature curve and the Weil-Felix reaction. There were no deaths in this series of cases and, as far as the author is aware, no death from uncomplicated typhus is recorded in children.

He points out the great danger to the adult community of these mild cases occurring in children, and the possibility of the transmission of the disease by unrecognised cases.

R. P. C.

i. BARDACHZI (Franz) & BARABÁS (Zoltán). *Ueber rudimentär ausgebildetes Fleckfieber*. [Atypical Cases of Typhus.]—*Wien. Klin. Woch.* 1917. July 5. Vol. 30. No. 27. pp. 845–846. With 4 charts.

ii. POPPER (Hugo). *Ueber Fleckfieber ohne Exanthem*.—*Ibid.* Nov. 1. No. 44. pp. 1384–1387. With 8 charts.

i. During the course of an epidemic in Eastern Galicia the authors had under their observation and treatment 342 cases of typhus fever. The majority of these cases ran a typical course but amongst them were several atypical cases and cases in which no exanthem was noted. Of eleven children only 5 gave a typical clinical picture of the disease. In 3 the exanthem was so transitory and indefinite as to be of little aid in diagnosis. The notes on these latter cases are as follows :

(1) In one, a lad of 11 years, there appeared on the face and in the submaxillary region scanty, irregular, pea-sized, livid roseolae which disappeared the following day. No further exanthem was noted. From the symptoms and clinical course of the disease, especially the behaviour of the pulse, the typical critical fall of the temperature on the 12th day, and the development of the Weil-Felix reaction—[a day before the crisis 1 : 320 and the day following the crisis 1 : 10,000] undoubted typhus fever was diagnosed.

(2) At the same time, the 13 year old sister of the boy fell sick with marked fever and the usual symptoms of typhus infection. The temperature persisted until the ninth day and fell to the normal on the eleventh day. On the seventh day of the illness a few spots, the size of pin heads, appeared in the right axilla. These disappeared on pressure and were not observed upon examination the following day. No further exanthem followed. The Weil-Felix reactions on the 8th, and 10th day of the illness were, respectively, 1:400 and 1:800.

(3) In a third case, a boy of 7 years, the illness ran a normal course, save that on the seventh day a scanty exanthem of rose-coloured spots, the size of peas, appeared on the skin of the abdomen and on the under surfaces of the extremities. The Weil-Felix reaction on the first day after the crisis was 1:320 and, on the eighth, 1:1,000.

Three further cases ran an entirely exanthem-free course. These had all been in recent contact with relatives who were suffering with severe and typical typhus fever.

ii. Popper states that, in an observation camp for typhus fever contacts, he has observed eight cases of typhus *sine exanthem*. They had all been in contact with persons who had recently developed severe typhus fever. They ran a fairly mild course, with high fever of sudden onset and more or less typical symptoms. The Weil-Felix reaction was positive in each of the cases. Of these cases, six were children and two young men of 19 and 37 years respectively. He concludes that a mild form of typhus fever may occur in the young and points out the danger of the transmission of the disease through the agency of such cases. One patient developed an abscess, just above the sterno-clavicular junction, from which a pure culture of staphylococci was isolated.

R. P. C.

VON CHIARI (Richard Freih.). **Die Veränderungen der Bindehaut des Auges bei Fleckfieber.** [Changes in the Conjunctiva in Typhus.] —*Wien. Klin. Woch.* 1917. Nov. 22. Vol. 30. No. 47. pp. 1479-1481. With 4 figs.

The inflammation of the conjunctiva, which is one of the characteristic symptoms of typhus fever, is stated by von Chiari to be due to localised damage to the walls of the small conjunctival vessels associated with marked perivascular infiltration. He considers it possible that typhus conjunctivitis is a manifestation of the presence of roseolae in this situation, and that, owing to the exceeding thinness of the epithelial layer, the subjacent active hyperaemia is early visible. He confirms KYRLE and MORAWETZ's observations regarding the same changes as those described above, as they occur in the small vessels of the skin.

R. P. C.

MARTINI (Erich). **Ein Fleckfieberfall mit Gesichtsexanthem.** [A Case of Typhus with Rash on the Face.]—*Deut. Med. Woch.* 1917. Sept. 6. Vol. 43. No. 36. pp. 1140-1141. With 3 figs.

A description of the case of a young Polish Jew, aged 17 years, who was admitted to the Wloclawek typhus hospital on the tenth

day of the disease. The case was remarkable because of the very extensive exanthem, which involved the whole of the body, head, face, and the mucosa of the mouth and trachea. The exanthem was made up of dark reddish-blue spots, which varied in size from that of a millet seed to that of a lentil. In addition there were patches of gangrene, the size of a florin, symmetrically arranged over both tubera ischii and further patches, also symmetrical, at the tips of the third toes. The Weil-Felix reaction was positive. The patient made a good recovery.

R. P. C.

MARTINI (Erich). *Mischinfektion mit Rückfall- und Fleckfieber.* [Mixed Infection with Relapsing Fever and Typhus.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. Dec. Vol. 21. No. 23-24. pp. 398-402. With 1 chart.

This is an account of a case in which the patient, a young Jewish woman, immediately after recovery from an attack of relapsing fever, was struck down with typhus fever. The two infections undoubtedly co-existed although both ran their normal course. The patient recovered, although seven months pregnant.

R. P. C.

JAFFÉ (Rudolf). *Zur pathologischen Anatomie des Fleckfiebers.* I. Die makroskopische Diagnoserstellung.—*Med. Klinik.* 1918. Mar. 3. Vol. 14. No. 9. pp. 210-211.

Death in typhus fever, according to Jaffé, usually occurs from the 10th-16th day and in only one third of the fatal cases is death solely attributable to the typhus virus. A further third succumb to complicating lobar pneumonia whilst septic infections claim the bulk of the remainder. He further observes that there is a marked tendency to haemorrhage in this disease, especially at the site of subcutaneous injections, and he states that he has observed considerable necrosis in the extensor muscles of the thigh as the result of an injection of optochin. The exanthem in fatal cases rarely fails and is markedly petechial. In those cases in which the exanthem is not present typhoid and meningitis must be excluded; but he considers that complications of these diseases with typhus, in the absence of the rash, are impossible of diagnosis macroscopically. Two cases of uncomplicated typhus, without the exanthem, terminated fatally on the 25th and 35th day respectively. Both these patients were elderly.

Regarding the *post mortem* appearances in typhus, the writer states that he agrees with ASCHOFF as to the extreme dryness of the muscles, the greasiness of the peritoneum and the presence of Zenker's degeneration in the recti abdominalis. The spleen, he states, is invariably enlarged, in the early stages of the disease bearing a striking resemblance to the spleen in septicaemia; and in the later phases exhibiting a characteristic red colour with brownish mottling of the pulp. In one third of the cases the kidneys show small punctate haemorrhages which are usually plentiful. No other abnormal condition is noted. The liver is stated to show no gross change, but the bile is described as extremely viscid and of a dirty green colour. The

brain shows no perceptible macroscopic changes. The fluid is usually increased and the brain substance congested. Small haemorrhages are usually found beneath all the serous surfaces. Jaffé records one clinically mild case which ended in death after 21 days and in which thrombosis of the vessels in the Sylvian fissure was noted. This case was convalescent and the condition was undiagnosed before the autopsy.

R. P. C.

ZUELZER (G.). Zur Pathologie und Therapie der Fleckfiebers.—*Deut. Med. Woch.* 1917. Aug. 16. Vol. 43. No. 33. pp. 1033–1036. With 5 charts & 1 fig.

Discussing the pathology of typhus fever, Zuelzer states that the liver and spleen attain their maximum enlargement at the commencement of the fever, decrease during its course and reach the normal when the fever ends. The increase in size, therefore, takes place during the incubation period and the writer states it is easily recognised before the onset of the fever. Zuelzer used this symptom for the purpose of isolating typhus fever cases from the contacts. Three contacts were diagnosed in this way, which developed the disease on the second, ninth and twentieth day subsequently. Latent typhus cases, in the absence of other causes (e.g., malaria, syphilis, and scarlet fever), may be similarly isolated by this means. The writer considers that quinine, given in 1–2 gm. doses daily, is an excellent prophylactic measure in typhus epidemics.

He also states that Wassermann's preparation "Hexyl" [a combination of nucleinic acid and hexamethylenetetramine] is of service in reducing the temperature. The temperature was successfully reduced after one intravenous injection, in six of the author's cases; and, in many others, after two such injections. Great reduction in the size of the spleen is noted within 24 hours of an injection of "Hexyl." In the case of those not so treated the reduction is stated to be very gradual. Zuelzer considers that "Hexyl" has no effect after the fourth day. In none of his cases were any ill effects noted after its use. Vacuole-like changes were observed in the leucocytes after the administration of this drug.

R. P. C.

DANIELOPOLU (D.). Traitement antitoxique des formes graves du typhus exanthématique par l'eau chlorée en injection intraveineuse.—*Bull. et Mém. Soc. Méd. Hôpît. de Paris.* 1917. Dec. 13. Year 33. 3 Ser. No. 33–34. pp. 1200–1202.

Excellent results in the treatment of severe forms of typhus fever are claimed by Danielopolu for the administration intravenously of chlorine water. The solution he uses contains 6.50 gm. sodium chloride and 0.5 gm. chlorine to the litre. This was given in 500 cc. doses on consecutive days during a period of 2–8 days. Over a thousand injections were given and these were confined to severe cases, special attention being directed to the leucocyte count; a count of 20,000 or more per cmm. during the second week of the disease being considered an indication for its use.

As a rule, the general condition improved and the leucocyte count was reduced—sometimes by one half in 24 hours. If the injections were discontinued too soon the leucocyte count again rose and a second injection was occasionally necessary, within the 24 hours, in order to achieve the desired object. Coincidentally with the decrease of the leucocytes the mononuclears are replaced by polymorphonuclears and plasma cells disappear from the blood. No ill effects were observed as a result of the injections, with the exception of rigors which were frequently noted. The amount of urine was slightly increased and the chlorine [as chlorides] considerably, as early as the first 24 hours. A slight increase in the coagulability of the blood was also noted, and the blood pressure was raised. No bronchial or lung troubles complicated the injections.

The cases treated by this method showed a death rate of 10 per cent., whilst cases of the same gravity, which were not so treated, showed a mortality of 92 per cent.

R. P. C.

KABELIK (J.). Ueber Rekonvaleszentenbluttransfusion bei Typhus exanthematicus. [Transfusion of Convalescent Blood in Typhus.]—*Wien. Klin. Woch.* 1918. Jan. 10. Vol. 31. No. 2. pp. 47–50. With 6 charts.

The author states that he has obtained good results in the treatment of typhus fever by the transfusion of blood from convalescent patients. Six cases were treated by this means and only one showed any ill effects. In this case there was a rise of temperature and the action of the heart became weak. The condition, however, immediately improved upon the intravenous administration of "Digalen," after which the course of the disease became normal. As a rule the pulse rate and general condition of the patient were immediately improved after the transfusion. He considers that :—

(1) The convalescent blood should be taken from healthy and strong individuals, shortly after the end of the fever. [Within the first three weeks.] (2) The transfusion is more effective if made before the appearance of the exanthem. At this period the fever is usually promptly cut short. If, however, the exanthem has already appeared, the treatment is still efficacious although slower in action. (3) A less dose than 20 cc. of the convalescent blood is not recommended.

R. P. C.

HILGERMANN (R.) & ARNOLDI (W.). Behandlung und Schutzimpfung bei Fleckfieber mittels Vakzinierung mit Proteus X₁₉. [Treatment and Prevention in Typhus by Vaccination with Proteus X₁₉.]—*Deut. Med. Woch.* 1917. Dec. 20. Vol. 43. No. 51. p. 1582. With 1 chart.

Notes on experimental work carried out by Hilgermann and Arnoldi with a view to protecting against the typhus virus by means of a vaccine made from the cultures of X₁₉. The vaccine was made from 24 hours old cultures, grown on agar slants, in the usual way. An initial injection of 0.05 cc. of the vaccine was given subcutaneously.

followed two days later by a second injection of 0.1 cc. (also given subcutaneously) and this was followed, two days later, by a third injection of 0.2 cc. given intravenously. No ill effects followed the subcutaneous injections but marked anaphylactic symptoms—dyspnoea, pyrexia, and, later, diarrhoea—resulted from the intravenous injection and necessitated the administration of calcium chloride, camphor and adrenalin.

The authors emphasize the need for commencing the intravenous vaccine treatment with very small doses and recommend 0.05–0.1 cc. as the initial intravenous dose, according to the condition of the patient. They do not consider that decrepit patients or those with defective or weak hearts should be submitted to these injections. The authors are of the opinion that more work is required on this subject before its true value can be justly estimated.

R. P. C.

PERIS (W.). Zur Frühd Diagnose des Fleckfiebers. [The Early Diagnosis of Typhus.]—*Therapie der Gegenwart*. 1917. Nov. Vol. 58. No. 11. pp. 395–397. With 4 charts.

The early symptoms of typhus fever and their value in diagnosis are discussed in the above paper and the author gives the following as his main conclusions.

Typhus cases of an atypical, exanthem-less type, in which the symptoms are not well marked, occur with moderate frequency at the beginning of an epidemic. The Weil-Felix reaction is always positive in these cases. The early clinical symptoms are:—conjunctivitis, laryngitis, bronchitis, intestinal disturbances and a prodromal rash which he describes as consisting of scattered, seed-like spots, bluish in colour and disappearing on pressure. The tongue is described as being dry, thick and furred, with the middle and edges unaffected. [MARTINI describes this furring of the tongue in typhus as typical and W-shaped.]

The serological diagnosis can be made after the third day and atypical paratyphoid fever and recurrent fever may be excluded by this means.

Peris emphasises the importance of the early diagnosis of the mild and atypical cases of typhus for reasons which are obvious. He states that the early prodromal rash is of considerable diagnostic value. It appears, on verminous patients, about the third day and is usually situated on the abdomen, rarely on the arms. It disappears in one or two days, when the true exanthem makes its appearance.

R. P. C.

ROTHACKER (A.). Nachprüfung der von Wiener angegebenen Fleckfieberreaktion. [Confirmation of Wiener's Typhus Reaction.]—*Münch. Med. Woch.* 1917. Dec. 11. Vol. 64. No. 50. pp. 1607–1608.

The author states that Wiener's urine reaction [see this *Bulletin*, Vol. 11, p. 129] is of diagnostic value in typhus fever from the second day of the disease until the 3rd–4th day after the fall of the fever.

Though it occurs in other diseases, yet it affords confirmatory proof in a clinically suspicious case of typhus. The author demonstrated the reaction in 100 per cent. of typhus cases and states that to obtain successful results the urine should have been recently passed. The reaction is stated to be always negative in typhoid and five days fever and Rothacker considers that a positive reaction is almost invariably associated with a high leucocyte count. Those diseases in which a positive reaction occurs, other than typhus, can be easily differentiated clinically. A table showing the results of a series of systematic examinations of all cases coming under the author's care is incorporated in the article.

R. P. C.

SALPETER (M.) & SCHMITZ (A.). *Beitrag zur Fleckfieberdiagnose.*—*Ztschr. f. Hyg. u. Infektionskr.* 1918. Feb. 22. Vol. 85. No. 2. pp. 157–173. With 6 charts.

In the opinion of the authors of the above paper—(1) a positive Weil-Felix reaction, which rises regularly and with a slowly falling titre during convalescence, (2) a positive diazo reaction, and (3) a negative Widal, are conclusive evidence of typhus fever—even though the case be atypical and without an exanthem.

They also state that the blood stasis phenomenon and, later, branny desquamation may be observed, even in the absence of an exanthem. Six charts of atypical cases (4 in children and 2 in adults) are embodied in the article. One case is noted in which a positive Weil-Felix reaction was obtained 17 months after recovery from the disease.

R. P. C.

WILENKO (G. G.). *Zur Diagnostik des Fleckfiebers.*—*Med. Klinik.* 1918. Feb. 3. Vol. 14. No. 5. pp. 111–112.

NEUBER's "diagnosticum" [see this *Bulletin*, Vol. 11, p. 140] is recommended by Wilenko, who states that in his hands it has given excellent results. He used the same technique as that advised by NEUBER in making the emulsion but recommends that it be passed through a sterile filter before the addition of the phenol. The "diagnosticum" retained its agglutinating power for five weeks.

R. P. C.

SACHS (H.). i. *Zur Serodiagnostik des Fleckfiebers.*—*Deut. Med. Woch.* 1917. Aug. 2. Vol. 43. No. 31. pp. 964–966.

ii. *Zur Kenntnis der Weil-Felixschen Reaktion. (Serodiagnostik des Fleckfiebers II.)*—*Ibid.* 1918. Apr. 25. Vol. 44. No. 17. pp. 459–462.

i. Sachs claims that the results obtained from the use of cultures killed by heat, in the Weil-Felix reaction, are not less satisfactory than those obtained when living cultures are used. He finds that cultures killed at 80° C. have a stronger agglutinating power than the living cultures, an advantage when the serum has a low power of agglutination. He records cases in which the agglutination with

living cultures was increased from 1 : 200 to 1 : 400 or even 1 : 800 by the use of the same cultures killed by heat. He considers that bigger clumps are obtained with the heat-killed cultures and that there is less doubt of agglutination having occurred than when the living cultures are used.

Sachs is of the opinion that different sera react differently to heated and living cultures. If X_{19} is heated to 56° C. it loses its agglutinating power, but it regains this power when the temperature is raised to 80° C. He adds 1 cc. of 5 per cent. phenol to 10 cc. of the killed cultures for preservative purposes.

ii. In the second paper the writer states that :—(1) An emulsion of X_{19} heated to 80° C. retains its full agglutinative powers with typhus serum after being kept for nine months, whilst an emulsion of the living organisms has completely lost its agglutinating powers during that period. (2) Whilst the agglutinating powers of X_{19} are not decreased by heating to 80° C. yet progressive heating of the bacillus does impair these powers. (3) With regard to dog sera immunized with cultures of X_1 , X_2 and X_{19} it was demonstrated that, when cultures killed by heat were used, X_{19} did not agglutinate the sera immunized with X_1 and X_2 (and *vice versa*) but was specific; whilst with living cultures no marked specific selection was shown.

R. P. C.

- i. FELIX (A.). **Serologische Untersuchungen an Fleckfleberkranken aus der asiatischen Türkei.** *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1. Teil. Orig. 1917. Dec. 28. Vol. 26. No. 6. pp 602-619
- ii. BRAUN (H.) & SALOMON (R.). **Ein Beitrag zum Wesen der Weil-Felixschen Reaktion auf Fleckfleber.**—*Deut. Med. Woch.* 1918. Jan. 17. Vol. 44. No. 3. pp. 59-60.
- iii. — & — **Ueber den Fleckfleber-Proteus-Bazillus (Weil-Felix). Zugleich ein Beitrag zum Wesen der Weil-Felixschen Reaktion auf Fleckfleber.**—*Cent. f. Bakt.* 1. Abt. Orig. 1918. Mar. 27. Vol. 81. No. 1-2. pp. 20-37.
- iv. OETTINGER (W.). **Zur Praxis und Theorie der Weil-Felixschen Reaktion.**—*Ibid.* Jan. 31. Vol. 80. No. 6. pp. 304-339.
- v. ZLOCISTI (Theodor). **Die Weil-Felix-Fleckfleberreaktion und ihre klinische Bedeutung.**—*Ztschr. f. Klin. Med.* 1917. Vol. 85. No. 3-4. pp. 197-250.

i. Working in Anatolia [Asia Minor], Felix obtained a positive Weil-Felix reaction, in 100 per cent. of 310 typhus fever cases, with X_{19} . The sera of various other diseases gave a normal agglutination of 1 : 25- rarely 1 : 50- in 10 per cent. of control cases. He is of opinion that X_{19} is specific for typhus. Two types of response, by the various sera of typhus fever patients, are noted :—

- (a) Cases of medium severity showed :—(1) An early response—agglutination of X_{19} occurring usually about the fourth day.
- (2) A marked difference between the reactions with X_2 and X_{19} .
- (3) A very high titre.

(b) Mild or very severe cases showed :—(1) A much later response—the reaction being first noted about the seventh day. (2) Less difference between the response to X₂ and X₁₉. (3) A much lower titre.

ii. Braun and Salomon consider it a question whether the positive Weil-Felix reaction is due to an infection with the specific bacillus X, or whether it is due to the presence of a saprophytic *Proteus* bacillus which has special adaptability to the blood serum of typhus fever patients. These authors succeeded in immunising dogs against X₁₉ and their sera agglutinated this organism. The agglutination of X₂ was weaker just as in the case of typhus fever serum.

iii. A technical paper, further amplifying the matter dealt with in the above paper. The authors divide the various *Proteus* strains, isolated from man, according to their cultural and agglutinative properties.

iv. Oettinger states his opinion that a positive Weil-Felix reaction is proof of typhus infection. He considers that a titre of 1 : 200 should be attained as definite proof, although a titre of 1 : 25 amply justifies the suspicion of infection provided the clumps are large. Strains of X₁₉ sub-cultured daily displayed no diminution of their agglutinative power.

v. Zlocisti is in general agreement with Oettinger, but thinks that a titre of 1 : 100 is conclusive proof of typhus infection. He considers the reaction specific for typhus fever. He confirms the observations of Felix that very severe cases show a low titre and notes that this was the case in 10 fatal cases which came under his observation.

R. P. C.

- i. WEIL (E.) & FELIX (A.). **Weitere Untersuchungen über das Wesen der Fleckfleberagglutination.**—*Wien. Klin. Woch.* 1917. Nov. 28. Vol. 30. No. 48. pp. 1509–1511. With 2 figs. & 1 chart.
- ii. ——— & — **Merkblatt zur serologischen Fleckfleberdiagnose nach Weil-Felix.**—*Münch. Med. Woch.* 1918. Jan. 1. Vol. 65. No. 1. p. 17.
- iii. CSÉPAI (Karl). **Beiträge zur Erläuterung der Weil-Felixschen Reaktion.** *Wien. Klin. Woch.* 1917. Oct. 4. Vol. 30. No. 40. pp. 1264–1266. With 4 charts.
- iv. JACOBITZ (E.). **Beobachtungen über Fleckfleber und über die Weil-Felixsche Reaktion.**—*Münch. Med. Woch.* 1917. Dec. 4. Vol. 64. No. 49. pp. 1576–1579.
- v. CSÉPAI (Karl). **Die Weil-Felixsche Reaktion mit Dauersuspension und einige Beiträge zur klinischen Verwendbarkeit derselben.**—*Wien. Klin. Woch.* 1917. Sept. 20. Vol. 30. No. 38. pp. 1202–1204.

i. From old agar cultures of X₁₉ Weil and Felix claim to have isolated two types of colony; one they designate O-forms the other colonies are styled H-forms. The O forms are so completely agglutinated by the serum of typhus patients that the authors consider that this is the form which occurs in, and has been isolated from, the patients' blood.

ii. A paper giving the technique of the Weil-Felix reaction as used by the authors. They state that they use only cultures grown on

neutral agar slants and always the living organisms. A variable agglutination points, in the authors' opinion, to the use of a culture grown on non-neutral agar. The use of suspensions of dead organisms for the test, as recommended by various authors, is not supported by Weil and Felix.

iii. A highly technical paper in which Csépai deals with various phenomena met with in the Weil-Felix test.

iv. Jacobitz states that he has obtained similar results by using OTTO and DIETRICH's method as when the methods of WEIL and FELIX were employed. He suggests that cultures of 2-3 days growth should be used as they show the maximum agglutinability and he considers them better in this respect than young cultures. If kept in cold store they maintain their agglutinability and develop an increase of it for at least two months. If agar cultures are more than four days old Jacobitz states that the results are not so good.

v. This paper describes the technique employed by Csépai for making a permanent suspension of \bar{X}_{19} for use in the Weil-Felix reaction. He claims more satisfactory results with his suspension than are obtained by him with the living organisms.

R. P. C.

MARTINI (Erich). Bewertung der Weil-Felix-Reaktion in der Seuchenpraxis. [Value of the W. F. Reaction in the Diagnosis of Infectious Diseases.]—*Deut. Med. Woch.* 1918. Feb. 28. Vol. 44. No. 9. pp. 236-238.

Typhus and typhoid fever are both stated to be endemic in Poland. Martini notes this to be the case among the population generally, but especially amongst the Jews, since the insanitary conditions of life and the filthy state of the people are favourable to the maintenance and spread of infectious diseases. Amongst these people, therefore, a positive serum reaction (in the case of either the Weil-Felix or Widal tests) does not necessarily indicate that the patient is, at the moment, suffering from either one or other of these diseases, but may point to a previous infection. He recommends that the clinical symptoms should be observed closely and that:—

(a) Typhoid should be diagnosed when the Widal reaction is first positive during the second week of the disease and if it attains a titre of 1:200-1:400.

(b) Typhus, when the Weil-Felix reaction is undoubtedly positive on the sixth day of the illness.

R. P. C.

MUEHLENS (P.) & STOJANOFF (D.). Beiträge zur Weil-Felixschen Reaktion nebst Beobachtungen über die Gruber-Widal-Reaktion bei Flecktyphus. [The W. F. Reaction and Remarks on the Widal Reaction in Typhus.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. July. Vol. 21. No. 13. pp. 213-229.

Working on typhus fever in Southern Bulgaria these authors arrived at the following main conclusions:—

(1) With one exception, the Weil-Felix reaction was positive in all clinically positive cases of typhus fever. Clinically severe cases,

with marked exanthem, gave a later and weaker reaction than clinically mild cases. (2) The Weil-Felix reaction is useful for retrospective diagnosis. (3) In control investigations the Weil-Felix test gave weak positive results in two cases of recurrent fever—1:50 and 1:100. In two other cases of recurrent fever with marked positive results, as also in a case of meningitis, the writers consider that typhus fever was a complication. (4) Typhus fever was repeatedly observed to follow recurrent fever. (5) The cases under observation, in 1917, ran a mild course and had a very low mortality. One case was noted without an exanthem. (6) Positive Widal reactions were frequently observed, and the authors are of the opinion that those typhus cases giving a positive Widal reaction had previously suffered from typhoid fever.

R. P. C.

i. KUHN (Philalethes). **Fragen der Paragglutination.**—*Cent. f. Bakt.*

1. Abt. Orig. 1917. Aug. 30. Vol. 80. No. 1-3. pp. 107-117.

ii. EPSTEIN (Emil) & MORAWETZ (Gustav). **Ueber die Züchtung der spezifischen *Proteus*-(X)-Stämme bei Fleckfieber. (Entgegnung auf eine Bemerkung in obiger Arbeit von Dr. A. Felix in Nr. 39 der Münch. med. Wschr. 1917.)** [Cultivation of Specific *Proteus* Strains in Typhus.]—*Münch. Med. Woch.* 1917. Nov. 27. Vol. 64. No. 48. pp. 1559-1560.

i. Kuhn states that paragglutinins may persist in the blood serum for months, and even years. He considers that there are many objections to the view that the Weil-Felix reaction is the result of a mixed infection of the organism producing typhus fever and *B. proteus* and he states that all the work hitherto done on this subject leads him to the conclusion that the reaction is a paragglutination. Regarding other diseases with unknown aetiology he suggests that investigations should be carried out with a view to the discovery of paragglutinable accompanying bacteria and the obtaining of accessory means of diagnosis.

ii. Epstein and Morawetz consider that X₁₉ belongs to the *Proteus vulgaris* group and that it is not identical with the strain of the Institute R. Koch.

R. P. C.

FINGER (A.) & KOLLERT (V.). **Beitrag zur Klarung des Wesens der Weil-Felixschen Reaktion.** [The Nature of the W. F. Reaction.]

—*Wien. Klin. Woch.* 1918. Mar. 7. Vol. 31. No. 10. pp. 270-271.

Finger and Kollert claim to have isolated from the blood of 120 non-typhus patients 35-40 *Proteus* strains of which three were agglutinated by typhus serum. These strains differed from X₁₉ in that they preserved their agglutinating powers for over a month without the addition of any preservative and also in that when heated to 55° C. two of them ceased to have the power of agglutination which they, however, regained on raising the temperature to 58° C. The third strain retained its power of agglutination throughout. The authors question whether it is not possible, by cultural methods, to transform a non-agglutinating *Proteus* strain into an agglutinating one. Their efforts to do so, however, were unsuccessful.

R. P. C.

WOLFF (Georg). **Zur Aetiologie der Weil-Felixschen Reaktion.**—*Deut. Med. Woch.* 1917. Nov. 29. Vol. 43. No. 48. pp. 1507–1509.

Wolff states that he has isolated the *Proteus* bacillus from the blood stream of eight, out of 78, cases of typhus fever. He does not consider that it plays any part in the aetiology of typhus fever, but that it bears the same analogy to the virus of typhus, as does the *B. suispestifer* to that of swine fever.

R. P. C.

FELIX (A.). **Ueber die angeblichen polyagglutinatorischen Eigenschaften des Serums Fleckfieberkranker.** [The Alleged Polyagglutinative Properties of the Serum in Typhus.]—*Wien. Klin. Woch.* 1918. Jan. 3. Vol. 31. No. 1. pp. 11–15.

Felix considers that no satisfactory proof has yet been advanced, by the various authors who cite organisms as being agglutinated by typhus fever serum, that a specific agglutination of any of these organisms is possessed by that serum. He maintains that the *Proteus* bacillus X is the only organism which possesses the property of being agglutinated by typhus serum, and that *M. melitensis*, Csernel's bacillus and *Proteus* bacillus Landsteiner, etc., are only agglutinated in very low titres or are agglutinated by typhus and control sera without any specific discrimination.

R. P. C.

WAGNER (Richard). **Ueber Komplementbindung mit Proteusantigen bei Flecktyphus.**—*Münch. Med. Woch.* 1917. June 12. Vol. 64. No. 24. pp. 792–793.

Working with *Proteus* X₁₉ as antigen, Wagner states that he has obtained complement deviation with typhus serum. His results were confirmed by the "Weil-Felix" reaction in all cases of typhus fever. Syphilitic and other sera, used as controls, gave uniformly negative results with the above antigen. The typhus sera gave a negative Wassermann reaction.

R. P. C.

CRONER-Charlottenburg (Fr.). **Laboratoriumsergebnisse von Serumreaktionen bei Fleckfiebererkrankungen unter der polnischen Zivilbevölkerung.** [The Serum Reactions in Typhus of the People of Poland.]—*Ztschr. f. Hyg. u. Infektionskr.* 1918. May 2. Vol. 86. No. 1. pp. 67–84.

As the result of his observations on typhus fever amongst the civil population in Poland Croner arrives at the following main conclusions :—

(1) Typhus fever occurs with equal frequency in both sexes. (2) Young people are more susceptible to the infection than their elders. (3) The Weil-Felix reaction is specific [over 1,000 positive reactions were obtained in typhus cases]. (4) A positive Widal reaction only occurs when the patient has previously suffered from typhoid fever, or in which typhus fever co-exists with that disease. (5) The serum of healthy persons and of scarlet fever patients gave negative

Weil-Felix reactions. (6) The failure of the Weil-Felix reaction does not necessarily exclude typhus fever, as the reaction may be first noted after the fall of the fever.

Croner states that, previous to the introduction of the Weil-Felix re-action, he had isolated bacteria from the blood, urine and faeces of typhus patients which were agglutinated by typhus serum. He considers, however, that they are of less value for diagnostic purposes than is X₁₉.

R. P. C.

KUCZYNSKI. Bacterium proteus X₁₉ (Weil-Felix) in der Kleiderlaus. [Proteus X₁₉ in the Body Louse.]—*Arch. f. Protistenk.* 1918. Apr. 27. Vol. 38. No. 3. pp. 376–391. With 4 figs.

Notes on a series of experiments carried out by Kuczynski with a view to determining the rôle played by the *B. proteus* (X₁₉) in typhus fever. For this purpose 72 clothes lice were artificially infected with a pure culture of X₁₉. The lice, which rarely survived 72 hours after the injection, were examined and Kuczynski makes the following observations:—

(1) X₁₉ and *Rickettsia* are not identical. (2) Characteristic growth of X₁₉ occurs in the louse. (3) It is possible that co-incident infection with *Rickettsia* hinders the development of X₁₉ under natural conditions. (4) The rod and thread-like forms [described by various authors, as developmental stages in the life-history of *Rickettsia*] are probably developmental stages in the evolution of X₁₉. (5) As no ill effects followed on feeding the experimental lice upon himself, the author is of the opinion that X₁₉ is non-pathogenic to healthy subjects.

R. P. C.

BRUMPT (E.). Au sujet d'un parasite (*Rickettsia prowazeki*) des Poux de l'homme considéré, à tort, comme l'agent causal du typhus exanthématique.—*Bull. Soc. Path. Exot.* 1918. Mar. Vol. 11. No. 3. pp. 249–258.

Working at Rennes, Brumpt states that of 72 clothes lice removed from healthy persons, 53 [i.e., 73·6 per cent.] harboured *Rickettsia prowazeki*. He allowed 66 of these (of which 50 were subsequently proved to harbour the parasite) to feed upon him on two or three occasions. No illness or infection resulted. Brumpt, therefore, does not consider that its presence in the blood and organs of patients points to its being the causative organism of typhus fever but considers it to be a non-pathogenic organism transmitted by the bite of the louse which by its presence only demonstrates the louse-infested condition of the patient. He states that lice infected with *Rickettsia* remain infected during the whole course of their existence whilst those infected with the typhus virus are only infective from the 8th–10th day after a meal on a typhus fever patient.

Twenty-seven *Pediculi capitis* taken from the head of a healthy child, in the same locality, showed no infection with *Rickettsia*.

TOEFFER is quoted as stating that typhus infected lice remain indefinitely infective.

No cases of typhus fever had been reported from the body of men who furnished the material for the above work.

R. P. C.

LÓPEZ VALLEJO (José). "**Las Inclusiones leucocitarias de Döhle**" en el **Tifo exantemático de la ciudad de México**. [Döhle's Intra-Leucocytal Bodies in the Typhus Fever of the City of Mexico.]—*Bol. de la Direccion de Estudios Biol.* 1917. Jan. Vol. 2. No. 1. pp. 92–113. With 1 coloured plate.

The author has been able to find the intra-leucocytal bodies discovered by DOEHLE in cases of scarlatina (*Münch. Med. Woch.*, 1912, July 23, No. 30) and also recognised by PREISICH and others in other diseases, in 77 out of 90 cases of typhus fever examined by him. The blood must be taken from well-marked cases of the disease and at the acme of the fever (6th to 10th day). From one to three bodies may be found in one leucocyte, and the proportion of leucocytes, always polynuclears, containing them may vary from 3 to 80 per cent. The films are allowed to dry in the air and are then fixed with absolute alcohol for a quarter of an hour. The bodies are stained blue by Giemsa and Romanowsky stains. In the hands of the author the slow Giemsa method succeeded best; Jenner's and Pappenheim's panoptic stain acting less well. The author does not venture to pronounce very decidedly on the nature of these bodies, but thinks that they may be Chlamydozoa.

J. B. N.

DUMITRESCO-MANTE. **L'intradermo-réaction au cours du typhus exanthématique. Son importance pronostique.**—*Presse Méd.* 1918. Jan. 31. Vol. 26. No. 6. pp. 50–51. With 5 charts.

This author states that he has systematically carried out the tuberculin skin test on 109 typhus patients; in which he adopted the intradermal method, as he considers it essential that the amount of tuberculin absorbed should be uniform and known to the operator.

In the first series of 52 cases, he injected each with $\frac{1}{2}$ mgm. of tuberculin [i.e., $\frac{1}{20}$ cc. of a 1:100 solution]; in the second series each of 57 patients was injected with 1 mgm. of tuberculin [i.e., $\frac{1}{8}$ cc. of the above solution]. The proportion of negative results in the latter series was less than in the former. Each patient was injected twice or more, and the tests were carried out at every stage of the disease.

The following summarise his main conclusions:—

(1) Three-quarters of the cases gave a negative reaction during the febrile period. (2) All those patients giving a positive reaction during the febrile period recovered. (3) During convalescence a positive reaction occurs more rapidly in the mild than in the severe cases. (4) If the reaction is negative after the decline of the fever, with the general state of the patient's health unsatisfactory, the prognosis is bad. (5) A negative reaction in a convalescent, with relapse, is usually indicative of a fatal termination. (6) In all fatal cases the reaction is negative for several days before death.

R. P. C.

ELKELES (G.). Vergleichende Untersuchungen am Blute von Fleckfieberkranken. [Comparative Blood Investigations in Typhus].—*Cent. f. Bakt.* 1. Abt. Orig. 1917. May 23. Vol. 79. No. 5. pp. 260–290. With 2 charts.

Elkeles considers that it is not possible to diagnose typhoid from typhus fever by a study of the relative percentage leucocyte counts. Arneth's count is similar in both diseases and consequently of little assistance. He suggests the following rules for the differential diagnosis :—

(1) A pronounced hyperleucocytosis of about 12,000 per cmm. and upwards is against the malady being typhoid at all stages of the disease. (2) A pronounced leucopenia of about 4,500 per cmm. or less is in favour of the malady being typhoid at all stages of the disease. (3) A normal count, high normal count and minimal leucocytosis up to about 12,000 per cmm. is :—

(a) *In cases of about one week's duration* not against the disease being typhoid, as these may be the rule and therefore these counts do not permit of distinctions being made between the two diseases.

(b) *From the end of the second week* is definitely in favour of the disease being typhus, because at that time there exists in the majority of cases of typhoid a definite leucopenia.

R. P. C.

STEFANOPOULO (G.). La leucocytose dans le typhus exanthématique.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1918. Apr. 18. 3 Ser. Vol. 34. No. 11–12. pp. 323–326.

During the winter of 1916–1917, the writer had under his care 200 cases of typhus fever, at the Greek hospital in Alexandria. His investigations as to the leucocytosis in that disease were carried out on 35 of these cases and he notes that none was suffering from any septic condition or had received any treatment which would result in an increased leucocytic count. None of the females used in these investigations were menstruating, pregnant or lactating. Stefanopoulo comes to the following main conclusions as the result of his studies :—

(1) The leucocyte count in typhus fever is increased, averaging 14,000 per cmm. There is an increase of the large mononuclears, diminution of the polymorphonuclears and extreme scarcity of the eosinophiles. (2) This hyperleucocytosis is in proportion to the gravity of the illness and is useful for prognostic as well as diagnostic purposes. It persists during the whole of the febrile period, commencing to decline after the fall of the fever and attaining the normal count about the twelfth day after the crisis.

He gives the following figures resulting from his analysis of the various differential leucocyte counts :—

Polynuclear neutrophiles :—

In 20 cases these cells made up 40–65 per cent. of the total count.

" 13	"	"	70–80	"	"
" 2	"	"	85–90	"	"

The last two cases died.

Lymphocytes :—

In 10 cases these cells made up 10–20 per cent of the total count.

„ 19	„	„	25–35	„	„
„ 6	„	„	35–48	„	„

Large mononuclears :—

In 9 cases these cells made up 2–14 per cent. of the total count.

„ 20	„	„	5–12	„	„
„ 6	„	„	15–25	„	„

Eosinophiles :—

These cells were very rarely met with—in one case forming 2 per cent. and in another 6 per cent. of the total count.

The mortality for the total cases was 12 per cent. and the author considers that the smallness of this percentage is due to the systematic treatment of the cases with lactophenine, adrenaline and electrargol.

R. P. C.

MIYASHIMA (K.), KUSAMA (S.), TAKANO (R.), YABE (S.) & KANAI (S.).
[*Experimental Study of Typhus Fever.*]—*Saikin Gaku Zasshi (Jl. Bacteriol.)*. 1917. Aug. 15. No. 163. pp. 613–646.

[From Review by R. G. MILLS.]

This study was primarily undertaken to test the work of FUTAKI, in the course of which he described the spirochaete supposed by him to be the cause of this disease. The detailed work of these authors shows conclusively that the organism in question is a non-pathogenic spirochaete. No changes in temperature or condition of the guinea pigs and monkeys used for the test were noted.

Four blood samples, from as many patients with typhus, were carried through (2–5 passages) guinea pigs and Japanese monkeys (*Macacus fuscatus*) and typical fever was noted on the 6th–12th day. No other change was observed and no causative organism could be found.

Seventeen lice were taken from the members of one family, suffering from typhus, washed with hydrogen peroxide, emulsified in saline and injected through 3 generations of monkeys and one of guinea pigs. A transmissible fever-producing substance was proved to exist in these lice, causing a rise in temperature about the 19th day.

A colour drawing illustrates the erythematous rash produced on the faces of those monkeys which had been injected with the patients' blood, but it is not quite clear whether this also followed the injection of the lice emulsion.

Another plate of 9 drawings in colour illustrates the findings in the cells of the blood and bone marrow after staining with Giemsa. In the blood of normal monkeys a few dark granules could be occasionally found which under the above conditions were greatly increased in number. These granules were round, comma or mulberry shaped. These are not believed to be the causal organism but represent a blood reaction to the infection. One of the figures represents a bone marrow cell in which the eosinophilic granules are greatly degenerated. Rod-shaped bodies in the erythrocytes of the circulating blood were also observed.

The granules (described above) occur during the incubation period of the disease in monkeys, are in 10 per cent. of the bone marrow cells on the 4th day [of incubation?], and 55 per cent. on the 5th. They persist during the fever, involve 96 per cent. of the cells on the 2nd day [? of the fever], 5 per cent. on the 4th and are absolutely gone by the 5th. The authors, consequently, conclude that they are not causal in nature.

In the early part of the disease in monkeys there was a slight decrease in leucocytes, later this was replaced by a slight increase.

R. P. C.

BASS (Robert). Die sanitätspolizeiliche Bekämpfung des Fleckfiebers im Felde. [Control of Typhus in the Field by Sanitary Inspectors.] —*Münch. Med. Woch.* 1917. Aug. 14. Vol. 64. No. 33. pp. 1088–1089.

This article contains nothing new in principle but gives the measures which Bass adopted to stamp out typhus fever from the area in which he was working, with a minimum of materials and labour.

He describes his experiences with one of the armies on the Russo-Roumanian front during 1916 and the spread of the disease by the migrations of the refugees from the infected and invaded territories. A corps of sanitary police was instituted, whose duty it was to discover mild, atypical and concealed cases of the disease amongst the civil population and remove them to the isolation hospital. All doubtful cases were treated as "suspects" and removed. Delousing was carried out in the usual way and "contacts," if found to be free from the disease, were freed from lice and sent home again. As a punishment for concealing the disease "contacts" were quarantined.

The stage at which the disease was discovered was considered to be the test of the efficiency of the system and the value of each individual police officer's work.

R. P. C.

i. **MARTINI (Erich). Ueber die Isolierungszeit bei Fleckfieber.** [The Isolation Period in Typhus]—*Deut. Med. Woch.* 1917. Nov. 15. Vol. 43. No. 46. pp. 1448–1449.

ii. **PFEIFFER (Alfred). Ueber die Isolierungszeit bei Fleckfieber.**—*Ibid.* Dec. 27. No. 52. p. 1615.

i. The author of the first paper considers that seventeen days is a sufficiently long isolation period for those suspected of harbouring typhus infection. He thinks that 21 days is unnecessarily long; as only one, out of 1,000 suspected cases, developed typhus fever as late as the sixteenth day. The majority showed definite symptoms of the disease before the eighth day and the remainder up to the fourteenth day. All cases suspected of harbouring the disease were freed from lice as early after their arrival as was possible.

With regard to patients who had suffered from typhus fever, Martini permitted them to leave the hospital as early as the tenth day after the end of the fever—provided that they were free from complications. He considers that to retain them from 14–21 days is needlessly long and he claims the advantage of saving four days' food by

following his routine. Those who have suffered recently from typhus fever (i.e., within the past two years) he considers to be immune and he thinks their detention unnecessary. He also suggests that the Weil-Felix reaction might be used for the purpose of identifying "immunes" and preventing their needless detention.

ii. Pfeiffer is in complete agreement with Martini as to the length of the quarantine period.

R. P. C.

VENEMA (T. A.). Gedanken zur Bekämpfung durch niedere Tiere übertragener Krankheiten (namentlich des Fleckfiebers). [Speculations on the Prevention of Typhus.]—*Münch. Med. Woch.* 1917. Sept. 18. Vol. 64. No. 38. pp. 1230-1231.

The writer suggests that protective anti-bodies, which would render human blood unpalatable to the louse, might be induced by the injection of some substance (e.g., crushed lice) into the circulation. He quotes H. W. FRICKLINGER as stating that certain people appear to attract lice, whilst others living with them, or under similar conditions, enjoy an immunity from these pests. He suggests that lice fed on typhus blood for four or five days and injected into the human host, after suitable technique, would afford protection against typhus fever.

R. P. C.

ODRIOZOLA (Ernesto). Hemiplegia consecutiva á tifus exantemático. [Hemiplegia Consecutive to Typhus.]—*Cronica Med.* Lima. 1917. Apr. Vol. 34. No. 646. pp. 131-134.

A clinical lecture on a patient aged 27 years who presented symptoms of hemiplegia after a severe attack of typhus. A favourable prognosis was given. An exact diagnosis of the nature of the cerebral lesion was not hazarded.

J. B. N.

McVICAR (Neil). Irido-Cyclitis as a Complication of Typhus Fever.—*S. African Med. Rec.* 1917. Dec. 8. Vol. 15. No. 23. p. 357.

In this note McVicar reports two cases of iridocyclitis occurring in coloured children, who had previously suffered from an illness which the writer presumes to have been typhus fever.

R. P. C.

CHOLERA.

MEGGENDORFER. **Ueber eine abgeschlossene Choleraepidemie mit zahlreichen Mischinfection.** [Cholera Epidemic with Mixed Infection.] —*Cent. f. Bakt.* 1. Abt. Orig. 1918. Jan. 31. Vol. 80. No. 6. pp. 273–290.

An epidemic among 100 soldiers, who partook of a salad washed in infected water and of whom 50 became ill, is described. The interesting feature was the mixed nature of the infection, for while 76 per cent. of the cases were cholera 44 per cent. were typhoid, paratyphoid A and B and 8 per cent. were dysentery; 28 per cent. sickened first with cholera and then with typhoid or paratyphoid fever, 2 per cent. with cholera and dysentery and 6 per cent. with cholera, paratyphoid and dysentery; the various diseases appeared one after the other in the various cases at times corresponding to their incubation periods, thus indicating that the infections were simultaneous. The complications gave clinically the picture of cholera cases of a chronic character.

A case of paragglutination is appended as a warning against relying on the agglutination test as the sole criterion. An organism was isolated from a healthy soldier who, except for diarrhoea lasting a few days while stationed on the Eastern front a couple of years before, had always been in good health. This bacterium while agglutinating with cholera serum to full titre limit, was a large motile rod, fermenting glucose and turning litmus milk blue; a serum prepared from it was incapable of agglutinating the Koch vibrio while clumping the organism itself in a dilution of 1:12,800.

H. Schütze.

KERSTEN (H. E.). **Ueber eine Choleraepidemie, ihre Bekämpfung und den Einfluss der Schutzimpfung auf ihren Verlauf.** [A Cholera Epidemic, its Treatment and the Effect of Prophylactic Inoculation on its Course.]—*Münch. Med. Woch.* 1918. May 21. Vol. 65. No. 21. pp. 563–566. With 1 diagram.

A small epidemic occurring among German troops in a Turkish town during April 1917; of 59 officers and men 50 were infected, mostly very slightly. Most cases occurred during the first 2 days. The course of the epidemic was as follows:—1st cases 10.4.17; disease recognized 12.4.17 (not earlier because of its mildness); last cases (2, apparently contacts from the first ones), 16.4.17; last carrier discovered 17.4.17 (3 further examinations revealed no others) Infection was traced to a spring; the water supply from it had been overlooked but was used for watering vegetables. On 7.4.17 salad

from this garden was eaten by the camp. The original source of infection was traced to a drain running some distance from the spring but by means of water colouration found to communicate with it subterraneously; in both spring and drain *V. cholerae* was found. An attempt is made to deduce the value of prophylactic cholera inoculation from the clinical records but the number of cases is obviously too small to be of much use. Four of the 12 deaths occurred in the small group of 5 persons of whom it could not be said that they had been inoculated or who were known never to have been inoculated. The usual isolation and disinfection precautions were rigorously carried out and reinoculation to some extent.

H. S.

DANYSZ (J.). *L'évolution des fièvres typhoïde et paratyphoïdes et du choléra. Vaccination préventive et bactériothérapie.*—*Presse Méd.* 1918. Jan. 17. Vol. 26. No. 4. pp. 29–31.

The author regards cholera and other intestinal illnesses of the typhoid-coli group as essentially of an anaphylactic nature. The sudden onset of cholera is ascribed to the following causes: massive doses are swallowed; the albumen of the vibrio is only partially broken down by the digestive ferments and is then absorbed; finding in many cases cholera antibodies (from previous infections, more or less slight) in the blood, the albuminous antigen unites with them and gives rise to anaphylactic shock which is considered to express itself in the various symptoms of the disease in question.

Therapy therefore would consist in giving cholera vaccine intravenously at short intervals (5 minutes or so) commencing with small doses and working rapidly up to large ones.

H. S.

LOWELL (Paul McC.). *Essential Factor in the Treatment of Pregnant Cholera Patients.*—*Philippine Jl. Sci.* Sec. B Trop Med. 1917. July. Vol. 12. No. 4. pp. 191–202.

The following two tables and the author's conclusions give a summary of the article.

TABLE I.

Showing the admissions, recoveries, deaths, and mortality of the pregnant and the nonpregnant cases under discussion.

	Admissions.	Recoveries.	Deaths.	Mortality.
Nonpregnant ..	302	245	57	Per cent. 19
Pregnant ..	*66	36	30	45
Total ..	368	281	87	23

* Eleven cases are excluded for later consideration.

TABLE II.

Showing foetal and maternal mortality in pregnant cholera patients.

	Months of pregnancy.								Total
	2nd	3rd	4th	5th	6th	7th	8th	9th	
Patients who aborted :									
Deaths	2	1	1	3	2	2	5	2	18
Recoveries	0	4	1	4	3	1	0	6	19
Mortality for the mother per cent	100	20	50	43	40	66	100	25	49
Average percentage for the first four months, the second four months, and the ninth month			44				60	25	49
Patients who did not abort :									
Deaths	0	3	0	1	2	3	2	1	12
Recoveries	2	4	1	2	2	4	2	0	17
Mortality for the mother, per cent. ..	0	43	0	33	50	43	50	100	42
Average percentage for first four months, the second four months, and the ninth month.. ..			30				40	100	42
Sum total for both :									
Total mortality for the mothers, per cent. ..	50	33	33	40	44	50	77	33	45
Total mortality for foetuses, per cent. ..	50	66	66	80	78	60	77	88	71
Tendency to abort per cent.	50	42	33	70	55	30	55	90	56
Average percentage of abortions for the first and second periods of the pregnancies ..			47					60	

" 1. Pregnant cholera cases have a higher mortality than non-pregnant cases, if left to their own resources.

" 2. The later the pregnancy the graver is the prognosis for the mother.

" 3. There is some factor other than mechanical which kills the foetus very early in the disease in the majority of the cases.

" 4. Abortions occur in most of the cases, and the older the foetus the greater is the tendency to abort.

" 5. Most of the pregnancies come to a fatal termination.

"6. Abortion is nature's therapeutic measure in aiding the mother in her fight for life.

"7. The essential factor in the treatment of pregnant cholera cases is to remove the dead foetus as soon as possible and in the manner best suited to the mother's condition, because it shortens the period of convalescence, preserves the strength of the mother, and reduces the mortality to about that of the nonpregnant cases."

H. S.

SCHOEBL (Otto). **A Survey of Certain Chemicals with Regard to their Bactericidal Action on Cholera Vibrios within the Body of Experimental Cholera Carriers.**—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1917. Sept. Vol. 12. No. 5. pp. 215-231.

Guinea-pigs infected with cholera by gall-bladder inoculation were treated with a variety of compounds given intramuscularly and per os. Doses ranging to the lethal were given and at the death or the killing of the animal not later than 10 days after infection search was made for the vibrio in the bile and various sections of the alimentary canal. With no drug were striking successes obtained, but methylene blue, arsenic compounds and guaiacol disinfected the tissues in one or two cases.

H. S.

GAUDUCHEAU (A.). **Action du thymol sur le vibrion du choléra.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1916. May. Vol. 7. No. 5. pp. 158-162.

Finding that upwards of 70 per cent. of the natives of Cochin-China were infected with ascaris, the author considered whether the administration of thymol in the treatment of their parasites might not at the same time serve to cure cholera carriers. Experiments were carried out *in vitro* with the vibrio in an albuminous (egg solution) environment and it was found that thymol emulsified in concentration of $\frac{1}{1000}$ killed the vibrios (exact numbers not given) in 3 hours at 37° C. By giving three $\frac{1}{2}$ gm. doses at hourly intervals in a total amount of half a litre of water and waiting 3 or 4 hours before giving other liquids or solids, the author considers cholera carriers might be successfully treated. No attempts at such treatment are reported.

H. S.

GAUDUCHEAU (A.). **Sur le vibrion cholérique du Tonkin et sur une association de ce microbe avec un flagellé.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1915. Dec. Vol. 6. No. 10. pp. 429-433.

Two vibrios designated Hongay and Bac-giang, the former isolated from the blood and the latter from the stools of cholera cases, are cursorily dealt with. The Hongay vibrio does not liquefy gelatine; a certain relationship exists between it and the Bac-giang organism, as shown by the Hongay vibrio fixing complement to some extent in the presence of Bac-giang serum.

A flagellate which accompanied the vibrio infection is described and depicted in a number of plates. The author is undecided as to

whether it is a *Trichomonas* or a *Tetramitus*. Inoculation into the blood, injection into the rectum and feeding could not infect monkeys with the flagellate.

H. S.

GAUDUCHEAU (A.). **Caractères de deux vibrions du sang trouvés au Tonkin.**—*Bull. Soc. Méd.-Chirurg. Indochine*. 1916. May. Vol. 7. No. 5. pp. 154-157.

Two vibrios isolated from the blood of two febrile cases, not presenting cholera symptoms or giving typhoid agglutination, are described; motile, uniflagellate, Gram negative, not encapsuled or spore bearing, gelatine not liquefied, no indol, glucose, lactose, saccharose, mannite, maltose, dextrin, glycerin not fermented; they do not agglutinate with cholera serum nor do sera prepared from them clump the Koch vibrio nor is cross agglutination for themselves obtainable, except to a very slight extent.

Two further vibrios obtained from the blood of two other febrile cases were found to correspond as regards agglutination with one of the pair just described.

The author cannot decide whether the vibrios are secondary invaders or have aetiological significance.

H. S.

GREIG (E. D. W.). **Bacteriological Studies of Cholera-Like Vibrios isolated from the Stools of Cholera Cases in Calcutta. IV. Virulence Experiments.**—*Indian Jl. Med. Res.* 1917. Oct. Vol. 5. No. 2. pp. 340-349.

Some 65 cholera-like strains were tested for virulence by inoculating rabbits intravenously and pigeons intramuscularly. Out of 24 strains injected into pigeons 8 produced fatal results. These 8 strains do not fall into special serological groups (Greig's) as compared with the 16 non-lethal strains, so that the author regards CHALMERS and WATERFIELD's pigeon pathogenicity classification as inadequate [this *Bulletin*, Vol. 8, p. 499].

H. S.

WOLLMANN (Sophie). **Beitrag zum Studium der Haemolyse durch Vibrionen, zur Differenzierung der Cholera-vibrionen von anderen Vibrionen.** [Haemolysis, a Means of Differentiating Cholera from Cholera-Like Vibrios.]—*Wien. Klin. Woch.* 1917. Aug. 30. Vol. 30. No. 35. pp. 1105-1107.

The author working with 22 cholera strains comes to the following conclusions:—(1) that a point of difference between the El Tor and similar strains on the one hand and the Koch vibrio on the other is that the former produce clear zones round colonies on goat blood agar plates within 24 hours, while the latter does this, if at all, only after that space of time; (2) that only El Tor strains produce soluble haemotoxins in broth cultures; (3) that the clarification of blood agar plates by cholera vibrios is in the nature of a physicochemical

process, such as ensues when certain metals are laid upon an agar surface (catalytic-electrolytic phenomenon). The El Tor types are therefore to be regarded as being quite distinct from the true Koch bacillus [cf. VAN LOGHEM; this *Bulletin*, Vol. 3, p. 480].

H. S.

VAN LOGHEM (J. J.) & NIEUWENHUIJSE (J.). **Paraffinum liquidum zur Erhaltung von Dieudonné's Blut-Alkali-Mischung.** [Liquid Paraffin as a Preservative of Dieudonné's Blood-Alkali Mixture.] —*Cent. f. Bakt.* 1. Abt. Orig. 1918. Jan. 31. Vol. 80. No. 6. pp. 383-384.

To preserve Dieudonné's blood-alkali mixture from the denaturing influence of the CO₂ of the air, the authors recommend a layer of liquid paraffin. It is not necessary to wait for the Dieudonné mixture to reach its optimum condition before covering with paraffin. A freshly prepared sample covered at once will in 7-14 days give agar plates which are ready for immediate use and the mixture remains in that condition for months—the authors have tested it as long as ten.

H. S.

SUKEGAWA (K.). [Cholera Enrichment Method for Demonstrating the Organism in Feces.]—*Saikingaku Zasshi (Jl. Bacteriol.)*. 1917. May 15. No. 260. pp. 403-407.

[From Review by R. G. MILLS.]

A medium was prepared with Terauchi peptone 40 gms., pure sodium carbonate 10 per cent. 80 cc., salt 5.0 gm., gentian violet solution 10 cc. (1-200 dilution of a 1 per cent. alc. sol.) made up to 1 L. with distilled water. This was distributed into tubes of about 10 cc. each and for use was inoculated with 2 loops of the suspected faeces. This was incubated for 6 hours and a subculture, made from the cloudiness that formed about the walls of the tube at the top, was implanted on a slant of a special agar medium. After a growth of 12-16 hours Pfeiffer's test, etc., was carried out. The agar was composed of the above constituents plus 20 gms. of powdered agar per litre. In 39 cases out of 50 the only organism carried over in this technic was the true cholera vibrio. In a series of tests on other members of the families for the presence of carriers there were occasionally some Gram negative cocci able to withstand the selective action. A test of the efficiency of the method was made by mixing a sample of faeces with a loop of culture in a dilution of 1-20,000 and the organism was isolated in every instance.

H. S.

MINAMISAKI (Y.). [Cholera Vibrio Staining Reaction following Exposure to Air.]—*Saikingaku Zasshi (Jl. Bacteriol.)*. 1917. Apr. 20. No. 259. pp. 354-359.

[From Review by R. G. MILLS.]

All the strains tested under these conditions gradually lost their staining qualities except the El Tor.

H. S.

RONDONI (Pietro). Sul periodo di conservazione ed usabilità del vaccini (antififico ed anticolerico). (Nota sperimentale). [The Conservation of Typhoid and Cholera Vaccines and their Efficiency.]—*Sperimentale*. 1918. Feb. 12. Vol. 71. No. 5-6. pp. 373-391.

Using rabbits and inoculating them subcutaneously with 2 cc. of a 2,000 M vaccine, the author obtained the following results, 11-12 days after the inoculation.

Rabbit sera.	Agglutinin Titre.	Bacteriolysin Titre (<i>in vitro</i>)
Fresh vaccine { 1	1 : 1000	0·0005
{ 2	1 : 350	0·001
Four months old vaccine kept in cold room { 1	1 : 500	0·002
{ 2	1 : 250	0·005
{ 3	1 : 50	0·005
Four months old vaccine exposed to warmth and light of laboratory { 1	1 : 50	0·05
{ 2	1 : 50	0·05

H. S.

WEBER (R.). Weitere experimentelle Beiträge zur aktiven Immunisierung gegen Typhus und Cholera. [Active Typhoid and Cholera Immunity.]—*Ztschr. f. Hyg. u. Infektionskr.* 1917. Dec. 9. Vol. 84. No. 3. pp. 425-448.

The writer demonstrates in a series of immunisations followed by test lethal doses the variation in antigenic power shown by an old laboratory cholera strain.

Cholera vaccine prepared from	Date of preparation of vaccine.	Date of immunisation of guineapig.	Guineapigs surviving.	Guineapigs immunised.
Three recently isolated strains	16.11.16	18.11.16	4	14
Do.	"	19.12.16	3	6
Do.	"	29. 1.17	13	14
Old strain isolated in 1905 ..	"	18.11.16	1	15
Do. ..	"	19.12.16	1	13
Do. ..	"	29. 1.17	4	17
Do. ..	24. 9.14	18.11.16	0	16
Do. ..	1. 4.16	18.11.16	3	16
Do. ..	"	19.12.16	4	6

As the test dose varies in toxicity from time to time, only batches immunised on the same date are comparable.

In spite of its age the vaccine prepared on 1.4.16 is a better immuniser than one prepared from the same strain and in the same way on 16.11.16.

The author decides that it is safer to use freshly isolated cholera strains for vaccine purposes, but it must be remembered that he has compared but one vaccine of each type (from young and from old strains) and then not altogether fairly as on two of the three occasions viz. the 18.11.16 and 19.12.16 batches, the strain used for the lethal test dose was one of the three recently isolated.

H. S.

QUARELLI (Gustavo). Sulla vaccinazione simultanea per via endovenosa contro il colera, il tifo, il paratifo A ed il paratifo B. [Simultaneous Intravenous Inoculation of Typhoid, Paratyphoid A and B and Cholera Organisms.]—*Riforma Med.* 1917. Sept. 22. Vol. 33. No. 38. pp. 913-915.

In a paper which has many references to work already published but which gives no account of new work done, the view is expressed that the optimum strength of the tetravaccine (Typhoid, Paratyphoid A and B and Cholera) is $\frac{1}{2000}$ of a loop of Typhoid, Paratyphoid A and B each, and $\frac{1}{10}$ of a loop of cholera. It is suggested that the vaccine should be kept in a dried condition on the internal surface of a glass vessel and emulsified in sterile saline as required. In this way the antigenic value of the vaccine remains undiminished. A loopful of culture is rubbed over the internal surface of a sterile test tube which is then placed in a vacuum over sulphuric acid for 24-36 hours, then at 100° for 2 hours and again in the desiccator for several hours, the tube being finally sealed off. Intravenous inoculation gives more rapid and persistent production of antibodies; the reaction is mild; the technique of inoculation is simple.

H. S.

MISCELLANEOUS.

BUCHANAN (G. S.). **Epidemics of the Eastern Campaigns.**—*Proc. Roy. Soc. Med.* (Sect. Epidem. & State Med.). 1917. Dec. Vol. 11. No. 2. pp. 1-30.

The author, who was a member of the Medical Advisory Committee in the Mediterranean, which visited Gallipoli, Salonica, Egypt and Mesopotamia, deals in his address with dysentery and diarrhoea, enterica, camp jaundice, cholera, malaria, trench fever and louse borne diseases, sand fly fever, "bilharzia," "leishmania" and diseases due to food deficiencies. In respect of the controversy on the relative prevalence of entamebic and bacillary dysentery on the Eastern Fronts the following is of interest:—

"As a working hypothesis, at any rate, here were grounds for regarding the whole outbreak [at Gallipoli] as one of acute amoebic dysentery in which amoebic infection had been originally contracted by the troops whilst waiting in Egypt, and had spread wholesale and rapidly under the conditions met with in Gallipoli; with my colleagues I signed one or two reports in 1915 in which this hypothesis was fully accepted. In view of subsequent experience I do not now think this was a correct view of the case. One understands now that the disintegration of tissue and lymphocytosis of acute bacillary dysentery may produce mucus with macrophages closely resembling free amoebae, and that when towards the end of the year more thorough bacteriological examinations were made of dysentery cases from Gallipoli Peninsula, dysentery bacilli were freely found. In the many epidemics which have been studied since, in Egypt, Mesopotamia and elsewhere, there has not been one which showed a preponderating acute amoebic infection."

He goes on to say that the amoebic infection has rarely accounted for more than 20 per cent. of cases. In view of the large percentage of healthy persons who harbour cysts he regards amoebic dysentery as "a concomitant of an epidemic due to other infections."

"The presumption was that men in these Eastern campaigns frequently ingest histolytica cysts, and give a lodgment to the resulting amoebae which will at most produce a passive ulceration and seldom enough destruction of tissue to cause any very definite symptoms—unless or until there supervenes an acute intestinal disturbance, by irritating food, by food poisoning, by any of the ordinary causes of diarrhoea, or still more by a Flexner, Shiga, or other bacillary dysentery infection. When this happens, a definite amoebic ulceration may follow, with all its clinical consequences."

Massing the figures from the various areas visited, "of 100 enterica cases in which the organism was recovered the figure for true typhoid was about 20, that for paratyphoid A anything between 50 and 70, and that for paratyphoid B 10 to 30." The typhoid was mild "or anomalous in type" except in 1915 in the New Zealand force which had been inoculated with inert vaccine. Little cholera was seen but 1,700 cases occurred in Mesopotamia before the visit of the Committee. Inoculation was practised in advance of any threatening of the disease. In June 1916 "the great historic epidemic" of malaria began in the Struma valley. Mosquitoes swarmed. "A man's daily bites were not to be counted by units but by the score; . . . the weekly evacuations ran into four figures." Prophylactic quinine was given, "where possible in doses of 6 gr. daily," with disappointing effect.

With regard to louse-borne diseases and panaceas against lice "nearly always one came back to current steam for clothing and blankets, or to cresol or petrol emulsions." To keep off sandflies exposed surfaces were smeared with vermijelli, which needed renewing only once or twice in an evening. Under "bilharzia" the writer speaks of the ova of the parasite being "ingested by molluscs." After giving an account of the prophylactic measures based on the results of the Bilharzia Mission to Egypt and their success—the lecturer remarks—"The foresight displayed in regard to this disease and the results obtained must be regarded as one of the most gratifying chapters in the preventive medicine of the war." It is noted that diphtheria was often rather extensively prevalent among British troops both in Egypt and Mesopotamia, and mumps was a source of much invaliding.

A. G. B.

CARNOT (P.) & TURQUÉTY (R.). *Les maladies d'importation exotique depuis la guerre.*—*Paris Méd.* 1917. Dec. 1. Vol. 7. No. 48. pp. 437-445.

This paper deals with amoebiasis, shortly with flagellate and cilian dysenteries, and with typhus, which at that date had not been recognised in France; readers are referred to other papers in the same number on relapsing fever and beriberi. The article, which is an interesting one, consists of an account of recent work chiefly by the French.

A. G. B.

RIVAS (D.). *The Consequences of the European War from a Medical Point of View.*—*New Orleans Med. & Surg. Jl.* 1917. Dec. Vol. 70. No. 6. pp. 506-513.

In view of the known fact that war is a means of dissemination of diseases from country to country the author traces the history of the spread of leprosy, cholera, plague, ankylostomiasis, filariasis and schistosomiasis from the Orient to Africa and Europe and thence to America. France, he points out, is now subject to similar conditions as at the time of the Crusades—there is a constant ingress of troops from almost every part of Africa and the Orient—and therefore it is essential that appropriate measures be taken to prevent the introduction of parasitic diseases to America by means of returning troops. He suggests "the organisation of a quarantine station in some of the islands in the Atlantic for the returning army where every soldier and officer should be submitted to a careful observation."

A. G. B.

MASTERMAN (E. W. G.). *Jerusalem from the Point of View of Health and Disease.*—*Lancet.* 1918. Feb. 23. pp. 305-307. With 2 figs.

The author was, before the war, Medical Superintendent of the English Mission Hospital at Jerusalem and from 1900 onwards has published papers on the diseases met with in Palestine. The city has about 80,000 inhabitants, two-thirds of whom are Jews. Details

are given of the climate, water-supply and drainage; the drainage is quite inadequate, and the water is stored in cisterns. There is little health organisation owing to the supineness of the Turks and the jealousy of the various nationalities. However an "International Health Bureau" was established by German agency shortly before the war [for some of the activities of which see this *Bulletin*, Vol. 9, p. 378]. "Jerusalem is a city of hospitals, but half of them could be emptied if an efficient department of public health would organise the needed reforms." The diseases are those both of temperate and semi-tropical climates. Tuberculosis of all sorts is very common. The great scourge is malaria; of 4,626 school children examined in the autumn 27.3 had parasites in the blood [no mention is made of spleen examinations] and of 7,771 persons "of all classes and conditions" 26.7 per cent. These were nearly all subtertian infections, which are absent in April and May. Benign tertian and quartan are also found. Tropical malaria is endemic in the Jordan valley, 3,700 feet below. Other diseases are blackwater, dengue, relapsing fever, Jericho boil (nature uncertain), leprosy. Bilharziasis and ankylostomiasis are very rare, if they occur at all, though both are so common in Egypt. Of eye diseases trachoma and acute ophthalmia are very common, the latter attributed to the Koch-Weeks bacillus (66 per cent.) and the pneumococcus (22 per cent.) "In Palestine not 10 per cent. of the population have absolutely sound eyes (Butler)." Finally, an account is given of the numerous hospitals. A useful list of references is appended.

A. G. B.

NICOLL (William). *The Conditions of Life in Tropical Australia.—Jl. of Hygiene.* 1917. Dec. Vol. 16. No. 3. pp. 269-290.

An interesting paper in which the author while not bringing forward any fresh facts asserts with some dogmatism his belief that the tropical portion of Australia is not colonisable by white men. He writes however later in the paper.—"Tropical Australia will never *under present circumstances* support a population of *exclusively* European character. That it will support a population of European descent I have no doubt, but it will be little more European than are the peoples of the Central and South American States."

It contains a positive contribution to the knowledge of dengue, which the author says is the cause of more sickness and ill-health in Tropical Australia than any other acute infectious fever.

"In the majority of cases the illness is short and the symptoms mild, but even in such cases the post-febrile effects may be serious. The heart is frequently dangerously affected, a common sequel being myocarditis of an acute or chronic type. The individual muscle fibres are damaged and a process of degeneration follows the acute stage. The valves are not primarily affected but the whole organ loses tone and becomes flabby. Dyspnoea on exertion is the most prominent feature and may persist for many months after the acute symptoms have passed. In my own case the myocardial affection is still evident even two years after the actual fever. It may be of interest to note that the condition was diagnosed as myocardial degeneration by two leading London heart specialists, irrespective of any knowledge of the previous history. Such an infection with such a sequel can only be expected to have serious consequences in persons over fifty, and there can be little doubt that this has been the cause of death in most of the fatal cases. . . . Several deaths occurred."

The work of BREINL and collaborators on the blood is severely criticised. The methods employed "to one accustomed to accurate haematological work make the blood run cold." "As neither collaborator apparently possessed any but the most elementary knowledge of mathematics or statistics it is not to be wondered at that, as an *interpretation* of the facts of the case, the results are absolutely and unequivocally worthless."

A. G. B.

BAUJEAN. **Fonctionnement du Laboratoire de Bactériologie de Phnom-Penh pendant l'année 1915.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1916. May. Vol. 7. No. 5. pp. 146-153.

In this year the work done at the laboratory at Phnom-Penh, the capital of Cambodia, was limited to routine examinations. Malaria parasites were found in 72 out of 301 examinations; most often *P. falciparum*. Of 298 children whose blood was examined in March 3 were found to harbour parasites, or 1 per cent. Typhoid fever is rare and only one case was met with. In the examination of 498 stools amoebae [*Entamoeba histolytica*] was found 83 times, *Ascaris* 75, flagellates (*Trichomonas*) 52, *Trichocephalus* 26, *Ankylostomes* 24, *Anguillulae* 22. Abscess of liver was seen twice, and only once in a native. Almost all of the bacteriological examinations were for plague, usually fragments of organs sent to the Laboratory by the M. O. H. The spleen was found to be the best organ for this purpose, as in fatal cases it usually contains the bacilli in considerable numbers, permitting a prompt diagnosis.

A. G. B.

MEMORIAS DEL II CONGRESO VENEZOLANO DE MEDICINA, reunido en la ciudad de Maracaibo, del 18 al 23 de Enero de 1917. [Proceedings of the Second Venezuelan Congress of Medicine, held at Maracaibo from Jan. 18th to Jan. 23rd 1917].—479 pp. 1917. Publicación ordenada por la Comisión Organizadora. Maracaibo: Tipografía Panorama.

The second Medical congress of Venezuela took place at the city of Maracaibo, under the presidency of Dr. F. E. BUSTAMANTE, between the 18th and 23rd of January, 1917. It was attended by 91 medical men, 16 pharmacists and 19 dentists.

In the section of General and Tropical Pathology papers were read on dysentery by Drs. BELLO, RODRÍGUEZ, YANES and TEJERA, the latter contributing a note on the treatment of amoebic dysentery with adrenaline, with a history of 4 cases. Leprosy was dealt with by Drs. JIMÉNEZ and LLAVANERAS, and a resolution was passed by the section recommending the reorganization of the existing leper-hospitals and the compulsory seclusion of all lepers in the State, together with X-ray installations in all hospitals for the treatment of the disease. A report on tetanus in the new born was presented by Dr. PÉREZ CARREÑO. The disease is known locally by the name of "Mocezuelo," against which popular name the author protests as causing mystification. Dr. NÚÑEZ TOVAR contributed a description of two new mosquitoes found in the State of Aragua, one of which is

identified with *Anopheles crucians* Wiedemann (*pictus* Loew.) and the other is considered as a subspecies of *Cellia albimana*. A paper by Drs. ITURBE and GONZÁLEZ records the first reported case of cutaneous leishmaniasis from Venezuela. Dr. RISQUEZ contributed a paper on fevers of indefinite duration caused by bilharziasis. Yellow fever also came in for a share of attention in this section, along with black-water fever. In the section of Hygiene the question of alcoholism received much attention. To those who are under the impression that the Spanish-speaking races are as a rule exceptionally sober, it comes somewhat as a surprise to learn that the vice of alcoholism should be regarded by medical men in Venezuela as a prominent and pressing evil. According to some analyses presented to the Congress by Dr. SUÁREZ BORGES, the local rum contains about 40 per cent. of alcohol by volume, while a specimen of local brandy contained as much as 50 per cent. Good beers, however, are brewed locally containing only 5 per cent of alcohol.

J. B. N.

NEIVA (Arthur) & PENNA (Belisario). **Viajem científica pelo Norte da Bahia, sudoeste de Pernambuco, sul do Piauí e de norte a sul de Goiás.** [A Scientific Excursion through the North of Bahia, the South-East of Pernambuco, the South of Piahy, and from North to South of Goyaz.]-*Mem. Inst. Oswaldo Cruz.* 1916. Vol. 8. No. 3. pp. 74-224. With 1 map & 28 plates.

This interesting memoir describes a journey made by the authors for scientific purposes in 1912 through the arid regions of Brazil, comprised in the provinces of Bahia, Piahy and Goyaz. The greater part of the report is occupied with descriptions of the natural history and remarks on the social and demographical conditions prevailing in the regions passed through, the authors' route being marked on a large-sized map. A number of photographs give the reader a good idea of the vegetation and other physical characters of this inhospitable country. All the rivers and streams are gradually diminishing in extent, and water has to be distributed in many places by railway to the inhabitants, on account of its scarcity. The damming up of water-courses, to conserve the supply, helps to augment the prevalence of malaria. Malaria is the principal scourge of these regions [see p. 142 of the report], and the inhabitants, as elsewhere in Brazil, are singularly apathetic as to its prevention and cure. Quinine is rarely employed and is both expensive and of bad quality, the sulphate alone being used. Infusions of the barks and leaves of various trees, of which the joazeiro (*Zizyphus joazeiro*) may be more especially named, are preferred by the majority. The varieties of malaria met with were exclusively tertian, both malignant and benign, and the principal mosquito transmitters are *Cellia argyrotarsis* and *C. albimana*. Chagas' disease is common and is more often found associated with the presence of *Triatoma sordida* than with *T. megista*, especially near water. Leishmaniasis was never met with, a fact which the authors attribute to the rarity of *Phlebotomus*, of which only 3 specimens were captured on the journey. From the north of Goyaz, however, the disease is reported, and there *Phlebotomus*, under the name of "*tatuquira*."

is known to be common. Anthrax is prevalent, being contracted from the cattle and principally from goats. The other diseases of the region are those to be expected from a poor and ignorant population in the tropics, and do not call for especial notice.

J. B. N.

SULDEY (E. W.). *Lèpre et maladies endémiques à Mohéli (Comores)*.—*Bull. Soc. Path. Exot.* 1918. Feb. Vol. 11. No. 2. pp. 61-64.

The population of this island, one of the Comoro group, is 4,500 persons of whom 3,900 are natives. Of this number in 1913 382 were ill [?at one date] and 120 died. The death rate greatly exceeds the birth rate; the natives meet any hygienic measure with unvarying inertia. Besides leprosy several diseases are prevalent. The malarial splenic index was 80 per cent. Of 261 patients carefully examined 61 had elephantiasis (51 of the legs, 10 of the scrotum). Syphilis is here a family disease and gonorrhoea is not regarded. Tuberculosis is general. Of the 261 sick 35 had advanced leprosy, and 47 early leprosy. They went about freely from village to village. One leper with a perforating ulcer of the foot kept shop. The author, who was Administrator of the island, isolated 21 of the worst on an islet, inhabited only by wild goats, where they are provisioned by the Government and are visited from time to time by their friends. He seems, however, to realise the unsatisfactory character of this arrangement.

A. G. B.

MANLOVE (C. H.). *Incidence of Age, Atheroma, and Aneurisms as seen in Autopsies of Filipinos*.—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1917. Sept. Vol. 12. No. 5. pp. 233-248.

This report is based on records of 5,400 autopsies performed over a period of nine years. It is similar to one from India by ROGERS [*Indian Medical Gazette*, 1910, Vol. 54, pp. 84-90 and 124-127] from which extracts and tables are given.

The conclusions are as follows:—

"1. The average duration of the life of Filipinos is shown by the statistics of the Philippine Health Service to be considerably below 40 years.

"2. The cause of death before 40 years of age in the greater percentage of Filipinos is due to the tropical diseases.

"3. The incidence of atheroma with associated hypertrophy of the heart and chronic interstitial nephritis increases suddenly after 40 years of age; this is an important factor in the cause of death after 40 years of age.

"4. Chronic intestinal disorder leading to chronic toxæmia is probably the most important factor in producing such a high percentage of atheroma.

"5. The aneurism incidence of Filipinos as seen at autopsy is 0.382 per cent.

"6. The chief manifestation of syphilis in Filipinos, as seen at autopsy, is in the arteries in 80 to 90 per cent of the cases.

"7. High blood pressures and strains do not appear to be important factors in the production of atheroma in Filipinos and probably not in the production of aneurisms.

"8. These findings concerning vascular lesions seen at autopsy in the Philippines agree closely with the findings of Rogers in India."

In the Philippines in 1914 72·9 per cent. of deaths occurred before the age of 40, and of 2,000 consecutive autopsies at Manila 81 per cent. were of persons below that age. A table of the general causes of death in the Philippines during 1914 shows that the chief specific causes were, convulsions of infants under 5, "fevers," tuberculosis, dysenteries and diarrhoeas, and "other infectious diseases," but of the total 155,029 no less than 65,938 are assigned to "other causes."

The incidence of atheroma was determined by the examination of the arteries in 1,000 bodies. The results are given for each decade in a table which is too large for reproduction. Whereas of 686 cases below 40 in 82 per cent. the arteries were normal, of the 314 above 40 in only 27 per cent. was this the case, 52 per cent. having "marked" atheroma. Of the production of atheroma increased blood pressure is not regarded as a primary factor because the Filipino blood pressure is low [see this *Bulletin*, Vol. 9, p. 260]; and as to syphilis only 4·33 per cent of the 1,000 cases of atheroma were definitely recognised as syphilitic. The intestines of 80 to 90 per cent. contained intestinal zooparasites; "It seems evident that such a condition extending throughout years must produce a chronic toxæmia of intestinal origin" and this hypothetical toxæmia is regarded as an important factor; strains and alcohol do not seem of importance. The aneurisms in this series numbered 40, 19 of which were in Filipinos, or 0·38 per cent., as against 7·8 in Americans in the series.

A. G. B.

WALSH (J. H. Tull). **The Geographical Distribution of Human Diseases and their Control.**—*Trans. Soc. Trop. Med. & Hyg.* 1918. Jan. Vol. 11. No. 3. pp. 105–123.

An interesting paper, giving food for thought, on a subject which has been rarely treated, out of text books, of late years. It cannot be summarised.

A. G. B.

LISTER (F. S.). **Prophylactic Inoculation of Man against Pneumococcal Infections, and more Particularly against Lobar Pneumonia; including a Report upon the Results of the Experimental Inoculation, with a Specific Group Vaccine, of the Native Mine Labourers employed upon the Premier (Diamond) Mine and the Crown (Gold) Mines in the Transvaal and the De Beers (Diamond) Mines at Kimberley—covering the Period from November 1st, 1916, to October 31st, 1917.**—*Publications of the S. African Inst. Med. Res.* 1917. Nov. 10. No. 10. 30 pp. [Price 5s.].

This is a record of work which should prove of the greatest value to medical officers responsible for the health of native labourers in the tropics, having regard to their great liability to pneumonia. The conclusions are as follows—

"(1) That from 63 to 77 per cent. of all cases of Lobar Pneumonia occurring under normal conditions in Native mine labourers in the Transvaal are caused by the *Pneumococcus* of one or other of the groups 'A,' 'B' or 'C.'

"(2) That Native mine labourers who have been suitably inoculated with a vaccine comprising certain pneumococcal groups are immune from Lobar Pneumonia due to such groups.

"(3) That three subcutaneous inoculations of one cc. of a vaccine containing representatives of groups 'A,' 'B' and 'C,' and having a total content of seven thousand millions of cocci per cc., have rendered a large Native mine population (Crown Mines) absolutely resistant to pneumonic infection by any of these groups during the observed experimental period of nine months.

"(4) That during the experimental period, when Pneumonia due to groups 'A,' 'B' and 'C' had been completely abolished on the Crown Mines, these three groups were still prevalent (in about their normal ratio to all groups) amongst the pneumonic Natives on those mines where inoculation was not practised.

"(5) That the unequivocal character of the results obtained on the Crown Mines suggests that triple inoculation with a three-group vaccine in doses of *less* than seven thousand millions of cocci would probably afford an efficient immunity against these three groups.

"(6) That the *Pneumococcus* groups of 'E,' 'H,' 'J,' and 'K' are probably of sufficient epidemiological importance to warrant their being included in future vaccine intended for Native mine labourers.

"(7) That the alteration of relative group prevalence by means of specific group inoculation is a more critical test of the efficacy of Pneumonia prophylaxis than the simultaneous comparison of Pneumonia rates in inoculated and uninoculated (control) groups—when such comparison is based upon the erroneous assumption that all cases of the disease due to the *Pneumococcus* are bacteriologically indistinguishable."

In the section headed, Nature of the evidence employed in evaluating the results, the author says why he did not use controls in the conventional manner. He believes that the control system confers a certain advantage upon the uninoculated.

"If Pneumonia is spread, as I believe it to be, either directly from case to case or through the agency of carriers it follows that the inoculation of half the inhabitants of a Native compound may interrupt the chain, not only of actual pneumonic patients, but also of carriers; if the inoculation achieves this it is obvious that the uninoculated half of the population will reap an advantage which is not allowed for in the calculations."

Again, "May not pneumococcal prophylactic inoculation of one-half of a community (the members of which live and work together), by diminishing the number of passages of a given strain of *Pneumococcus* over any stated period, tend to keep its virulence at a lower level than would otherwise have been the case?"

He gives the following five conditions as those governing a satisfactory experiment:—

"(I) The inoculated population should be large;

"(II) The experiment should extend over a lengthy period;

"(III) A bacteriological and serological investigation should be carried out in every case of Lobar Pneumonia occurring in the inoculated population during the experimental period;

"(IV) A comparison should be made between the rates of incidence of and, more especially, mortality from, Lobar Pneumonia in the selected population during the experimental period and the same rates in the same population over a lengthy period previous to inoculation;

"(V) The inoculation and medical history of every inoculated person should be accurately recorded and kept by the card system."

He lays great stress on No. III.

"Between 63 and 76 per cent. of all cases of Lobar Pneumonia amongst Native mine labourers is caused by the *Pneumococcus* belonging to one or other of the groups 'A,' 'B,' or 'C'; if the inoculation of a large group of labourers with a vaccine comprising these three prevalent groups greatly decreases the frequency of their occurrence, relatively to other pneumococcal groups, the result should constitute very weighty evidence in favour of inoculation."

A table shows that the *Pneumococcus* of Groups A, B and C occurred collectively in from about 77 per cent. (1914) down to about 63 per cent. (1917) of the cases, with an average for the five years of 68·9 per cent. A detailed serological and bacteriological investigation was carried out on every case of lobar pneumonia in the Crown Mines during the experimental period of nine months. With regard to No. IV. the three Mines had always experienced a very heavy mortality from lobar pneumonia, so that a substantial reduction coincident with inoculation would be valuable collateral evidence in its favour.

Details are given of the preparation of the vaccine, the dosage, and system of inoculation. The vaccine used in the three experiments consisted of the bacterial bodies from a young broth culture, suspended in normal saline; sterilisation was effected by addition of an antiseptic. The vaccine consisted of the groups A, B and C, with the addition of H for the De Beers mine.

The next section deals with the Premier Diamond Mine experiment. The following table gives the returns. All new arrivals, 10,507 in all, during the experimental period were inoculated. In the two months prior to inoculation there were 96 cases of pneumonia; during the experimental period there were seven in natives who had received three inoculations.

TABLE IV.

Premier Diamond Mine, Pneumonia Returns for the Years 1908–1913, inclusive, together with those of the Experimental Period, November, 1916–October, 1917, inclusive.

Year	Pneumonia incidence per thousand per ann.	Pneumonia mortality per thousand per ann.
1908	70·71	14·17
1909	104·88	17·97
1910	153·54	28·97
1911	128·98	26·94
1912*	67·68	19·96
1913*	31·75	4·80
1914)	Returns unavailable owing to interruption of mining by the war.	
1915 /		
Nov. 1916–Oct. 117 (Experimental period)	4·67	0·86

* During these years inoculation was carried out in accordance with the principles advocated by Sir Almroth Wright and his associates.

Similar results were obtained in the Crown Mines experiment. Of the 82 consecutive cases of lobar pneumonia investigated none were of the A, B, or C type; 13 were due to type H and 30 were unclassifiable; the vaccine contained only the *Pneumococcus* of A. B & C. The author anticipates improved results when certain additional groups of the pneumococcus are added to the vaccine. Several interesting points have not been referred to here.

A. G. B.

JOUIN (A.). Des complications pneumococciques extra-pulmonales chez les Noirs, les Malgaches en particulier (néphrite et hépatite toxi-infectieuses).—*Bull. Soc. Path. Exot.* 1918. Mar. Vol. 11. No. 3. pp. 159–163.

The author refers to his recent paper [see this *Bulletin*, Vol. 11, p. 226] in which he pointed out the frequency of sudden death from cardiac dilatation in pneumonia in the black races and the common occurrence of the bacilli in the blood. After the first two days renal and hepatic complications are the two great dangers. The kidneys of patients who succumb weigh from 180 to 250 gm. and have all the characters of the large white kidney of Bright's disease. The macroscopical and microscopical features are described. There is granular-fatty degeneration with desquamation of renal cells and collection of blackish granulations in the protoplasm. The changes in the liver are similar and affect chiefly the cells neighbouring the intralobular vein. The cells seem converted into fatty masses. Clinical examination of such patients reveals, besides icterus, signs of renal insufficiency, with uraemic phenomena of dyspnoic and gastro-intestinal form. There is no oedema. The therapeutic indications in such cases are these—

Avoid the employment of drugs, especially ammonium salts which augment the work of kidneys and liver. Act locally on the kidneys by letting blood in Petit's lumbar triangle. Use cold moist applications frequently. Give two litres of distilled water a day and half a litre of cold boiled skimmed milk. Obviate constipation and over-loading of the portal system by cold glycerinated enemata of one to one and a half litres.

A. G. B.

WALTHER (Ch.). Note sur une nouvelle méthode de traitement de l'éléphantiasis des membres.—*Bull. Acad. de Méd.* 1918. Mar. 5. 3 Ser. Vol. 79. Year 82. No. 9. pp. 195–198.

This method consists in the introduction of an unperforated rubber drainage tube, No. 10 or 12, from one side to the other of the area of arrest of the lymphatic circulation, so as to obtain its reestablishment. For the lower limb a small incision is made in the middle of the antero-internal aspect of the thigh and another in the abdominal wall. The tube is passed, over a Chaisaignac's trocar, in the deep layer of the superficial fascia against the aponeurosis. A button hole is made in the aponeurosis at each end, and the ends of the tube are passed through and secured by a stitch. The first operation was done twenty months ago and followed two unsuccessful ones by other surgeons. Twenty-five days later the circumference of the tumour at its greatest had diminished from 67 cm. to 38, and now the cure seems to be complete. Two other cases are described, the last that of a wounded soldier. The tubes cause no irritation of the tissues. The technique is tailed in *Bull. et Mem. Soc. Chir.*, 1916, August, p. 1996. It is not stated whether these were tropical cases, but of two it is said that there was no filariasis.

A. G. B.

OSORIO (Balthazar). **Um caso de elephantiasis do scroto.** [A Case of Elephantiasis of the Scrotum.]—*Med. Contemporanea*. 1917. Aug. 5. Vol. 35. No. 31. pp. 241-243. With 1 fig.

A photograph of a patient with a large elephantiasis of the scrotum had been sent to the author by a correspondent in the island of San Thomé. There is nothing of particular interest in the case. The patient, aged 65, had originally come to the island from the mainland of Angola.

J. B. N.

MONTEL (L. R.). **Un cas de Tabès chez un Annamite. Considérations sur le tabès aux Indes et en Extrême-Orient.**—*Bull. Soc. Méd.-Chirurg. Indochine*. 1916. Oct. Vol. 7. No. 8. pp. 244-255.

In 15 years of medical practice in Cochin China, during which more than 100,000 patients passed through the author's hands, he never met a case of tabes in an Annamite. In June 1916 such a case presented itself. The patient was a steamboat steward who had made many voyages to Europe. The signs and symptoms, which are described, were quite definite, but such interest was taken in the man that he disappeared before the notes were complete. The author comments on the extreme rarity of tabes and general paralysis in India, Burma, Indo-China and China, and gives a long quotation from COUCHOUD who has studied this subject. COUCHOUD points out that at an asylum at Canton there are many general paralytics but these are all in Chinese from the southern parts and there are none from "continental China." Similarly at Singapore where the Malays do not get either disease. In Japan the diseases are about as common as in France. Possible reasons are discussed. GAUDUCHEAU in the discussion suggested that there are two strains of syphilitic virus, a European and a South-Asiatic, the former capable of producing parasyphilis, the latter not. This strain would be at almost equal distance from *S. pallida* and *pertenus*. The germ of syphilis, he assumes, has become gradually modified in different races.

A. G. B.

WOODS (Andrew H.). **Diseases of Spinal Cord among the Chinese.**—*China Med. Jl.* 1918. Mar. Vol. 32. No. 2. pp. 116-121.

The author writes from two years' observation of clinical cases of nervous diseases in the Canton Hospital. He gives notes of the more interesting or rare forms. Syphilitic myelitis was common. There were four cases each of primary lateral sclerosis and disseminated sclerosis. Eighteen cases were finally diagnosed as locomotor ataxia. In each syphilis had been contracted. An account is given of their symptoms. It is noted that this disease is easily overlooked in the general run of medical and surgical patients, especially as ataxia is a late symptom. One of the patients, who had decided inequality of the pupils, had been operated on five times for abdominal pain. There is no hint whether these cases were coastal or from the interior.

A. G. B.

FUSCO (Pietro Paolo). **Le malattie mentali fra gli Arabi della Libia.** [Mental Diseases among Arabs in Libya.]—*Malaria e Malat. d. Paesi Caldi*. 1918. Feb.-Apr. Vol. 9. No. 1-2. pp. 5-12.

Notes on the principal forms of mental disease presented by Arabs during three years in a civil hospital at Tripoli. Alcoholism and syphilis provide but few cases; the latter disease shows a great tendency to cure in natives, and general paralysis was never observed. The fatalism of Mahomedanism is to a great extent a preventative of melancholia in the forms prevailing in Europeans, but on the other hand recurrent mania is common, and is often due to religious excitement. Hereditary tendency could be made out in a fairly large percentage of cases. No statistics are given of either age, sex or numbers.

J. B. N.

JOVIN (A.) **De la fréquence des Lipomes chez les Malgaches; leur variété, siège, étiologie, pathogénie.**—*Bull. Soc. Path. Exot.* 1918. Feb. Vol. 11. No. 2. pp. 113-116.

In the examination of Malagasies who had come to France for munition work it was noticed that 30 per cent. suffered from fatty tumours. The majority of these were circumscribed and readily enucleable, usually symmetrical, on each side of the vertebral column at the level of the scapular spine, of the size of a small orange. This site is the fulcrum of a lever of the first order when the Malagasies carry loads, the weight being the load itself suspended from a bamboo pole, the counter-poise the bearer's hand. A smaller number were diffuse lipomata, usually single, median, at the junction of the 7th cervical and 1st dorsal spines, resembling a wallet, consistency less hard than that of the former, not encapsuled. They are attributed by the author to the friction when the load is passed from one shoulder to the other. Examination has shown that it is a question of fatty infiltration and not degeneration. The mode of production is discussed. Adenolipoma of the inguinal region has been seen in about 2 per cent., bilateral, the skin non-adherent. These natives were syphilitic and had large spleens. This condition is supposed to originate in the glands, the fatty periadenitis being secondary.

A. G. B.

GAIDE. **Note sur la fréquence de la sarcomatose chez les Annamites de l'Annam. Observations.**—*Bull. Soc. Méd.-Chirurg. Indochine*. 1916. Jan. Vol. 7. No. 1. pp. 5-19.

In 18 months the author saw 30 cases of sarcoma, 20 of which were admitted to hospital. The seat of the tumour, sex, age, and treatment are given in tabular form. Of the 20, 12 were in men, 4 in women, and 4 in children. All varieties were met with. A short account is given of each case.

A. G. B.

CASALIS DE PURY (G. A.). **La syphilis et le cancer chez les Bassoutos. Histoire naturelle et médicale d'une tribu de l'Afrique du Sud.**—*Paris Méd.* 1918. Jan. 19. Vol. 8. No. 3. pp. i-vi. With 1 fig.

The writer claims some knowledge of the Bassutos because his grandfather, a contemporary of Livingstone, was the first missionary

among them, followed 25 years later by his father, a medical missionary, and after a similar interval by himself. In the grandfather's time the tribe practised communism and was very flourishing; prostitution was almost unknown and was very severely punished. When the father first went out the Bassutos were flocking to the diamond mines at Kimberley, just discovered, from which they brought back syphilis which, according to the writer, was previously unknown among them. It is stated to have produced extensive lesions of the bones and ulcerations with rapid cachexia; chronic syphilis affecting connective tissue was not seen. When he himself arrived communism had given place to European particularism. Prostitution was common and syphilis was general; the stigmata of hereditary syphilis were seen on every side. Up till then cancer was unknown. Dr. Casalis de Pury's father told him that he had been on the look out for it for 25 years without ever seeing a case. He however now began to see cases—carcinoma of the liver, breast, uterus, and cervical glands and osteosarcoma, all attacking young subjects and especially syphilitics. Epitheliomata were never seen, though they were common among the Boers. The author sees the relation of cause and effect between the syphilis, affecting bones and glands, and the cancer of the same tissues, both in young subjects, and in a soil previously free from neoplasms.

At this time he visited the Cape where he found cancer very frequent among the Dutch, a little less in the Anglo-Saxon, but abounding among the Dutch-Hottentot half breeds, who were also the most syphilised. After the Boer war he again visited the Bassutos. He found syphilis diminishing in intensity but cancer becoming more and more common. It attacked persons between 30 and 40 and the tissues already mentioned: cancer of the tongue and lip, in spite of much smoking, being almost unknown. Tuberculosis was becoming more general. The author believes that syphilis prepares the ground for cancer. He writes: "Il y a donc une diathèse hérédito-syphilitique cancéreuse incontestable."

A. G. B.

LACAPÈRE. *Vue d'ensemble de la syphilis tertiaire chez les indigènes du Maroc.*—*Presse Méd.* 1918. Mar. 18. Vol. 26. No. 16. pp. 146-148.

In the "Antisyphilitic Dispensary" at Fez between June 1916 and December 1917 the author saw 609 natives with tertiary lesions but only 28 and 167 with primary and secondary syphilis respectively. Statistics of the tertiary lesions are given in a table, from which it is seen that skin lesions numbered 301, subcutaneous gummata 83, lesions of mucous membrane 156, of bone 126, of joints 53. They were often multiple: thus 224 had two lesions, 104 had 3, and 79 had 4 or more, whereas only 210 had one. These tables illustrate the differences between European and Moroccan syphilis, which the author goes on to discuss.

1. The proportion of nervous lesions, 30 per cent in Europe (FOURNIER), is only 5 per cent. in Morocco. General paralysis and tabes were not seen. The reasons suggested by the author are—absence of mental exhaustion (*surmenage cérébral*) in the Moroccan; the tender

age at which the natives contract the disease; the character of the treatment—in the European it is directed as a rule against visible symptoms and is relaxed when these disappear, so that the virus takes refuge in less accessible quarters, whereas in the Arab cutaneous symptoms are treated either not at all or inadequately and the virus is not driven in.

2. In Europe tertiary lesions are very often single (90 per cent. FOURNIER); in the Moroccan they are generally multiple (65 per cent.). This is due to absence of treatment and is not a sign of malignancy.

3. Tertiary symptoms in Europe appear after a long quiescent period, and are separated by similar periods. In Morocco the secondary merges insensibly with the tertiary stage. This also is due to lack of treatment.

4. In Europe tertiary syphilis is manifested by one type of lesion—papule, ulcer, or gumma; in the native by a mixture. In other words in Europe it is monomorphic, in Morocco usually polymorphic. This again is attributed to lack of treatment.

A. G. B.

SITSSEN (A. E.). **Een paar opmerkingen over syphilis bij Inlanders.** [Syphilis in Natives (of Java).].—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1917. Vol. 57. No. 5. pp. 679–685.

The author found evidence of syphilitic arteritis in only 2 of 190 autopsies performed on prisoners dying in the jail at Soerabaja, and is accordingly inclined to support the views put forward by VAN DRIEL in a previous volume of the *Tijdschrift* (Vol. 54, p. 469), to the effect that syphilis in natives is not only rarer in proportion than in Europeans but also milder.

J. B. N.

SERGEANT (Edmond) & RAYNAUD (Lucien). **Multiplication intraganglionnaire d'un staphylocoque dans un cas rapidement mortel rappelant le bubon climatique.**—*Bull. Soc. Path. Exot.* 1918. Mar. Vol. 11. No. 3. pp. 157–159.

The patient was a white Martiniquian who after two days of pain in the belly and some fever was admitted to hospital at Algiers with enormous swelling in the groin and right iliac fossa, and the diagnosis—grave typhoid state; strangulated hernia or appendicitis; surgical intervention urgent.—He died in the night. An autopsy was made at once and plague was suspected. There was a chain of swollen glands which contained a diplococcus staining with Gram, but not the plague bacillus. It was found after cultivation to have acquired the character of *Staphylococcus aureus*. The diplococcus was cultivated from the spleen as well as the glands. Inoculations of splenic and glandular juice into mice were without result. Subcutaneous inoculations into rabbits and guinea-pigs gave rise to large abscesses. The case is regarded as one of Climatic bubo of exceptional severity.

A. G. B.

McKENDRICK (A. G.) & Fox (C. J.). Studies in the Aetiology, Course, and Treatment of Rabic Infection : Being a Review of the Statistics relating to Persons treated at the Pasteur Institute of India, Kasauli, during the Years 1912-1916.—*Indian Jl. Med. Res.* 1917. Oct. Vol. 5. No. 2. pp. 413-439.

The total number of cases treated in this quinquennium was no less than 22,519 of whom 20,509 were Indians; the paper relates mainly to these. The method of treatment was a 14 days' course of carbolized fixed virus. Only the main results of this careful and cautious statistical enquiry, supported by a series of detailed tables, can be given here.

There is no evidence of any change in the general prevalence of rabies in India during the past 16 years. The figures show a slight rise in the prevalence of human rabies during the monsoon period. The mortality increases, *ceteris paribus*, with the number of bites received; the mortality amongst persons bitten deeply as compared with those whose bites were superficial is as 4·8 to 1, and of persons bitten on bare skin as compared with those bitten through clothes as 6·6 to 1. Cauterisation has some effect in reducing the percentage mortality and the authors suggest that a great improvement in this direction might be achieved. In this Institute the mortality figures include all deaths whether a full course of treatment had been received or not; 282 persons or 1·25 per cent died in this period. After careful consideration of the figures the authors conclude that there is no relation between the incubation period and the degree of the infecting dose. As to the effect of treatment upon the mortality rate, they find "evidence of the handicap of late arrival [at the Institute] as shown by an increased mortality in cases of persons bitten on the face and arm, that is to say, amongst those cases in which the expected incubation period is relatively short and the handicap is consequently a heavy one." Finally they draw attention to the value of atropin in relieving throat spasm and hence tending to hold it in check until the phase of recovery sets in; 1/100 grain of the sulphate is injected under the skin every four hours.

A. G. B.

COOPER (Navroji Ardeshir). Analysis of 102 Consecutive Cases of Tetanus treated at Sir J. J. Hospital, Bombay, India, from October, 1915, to July 31st, 1917.—*Lancet.* 1917. Dec. 22. pp. 930-931.

After noting that tetanus patients do not come to the hospital "until their condition has become either worse or hopeless" the author notes that of the 102 cases 27 died before he had an opportunity of seeing them; of the remainder 42 recovered and 31 died. The methods of treatment are shown in a table wherein the cases are collected into 6 groups [so that the number in each is too small for statistical treatment]. The best results appear to have been obtained by the employment of anti-tetanic serum, chloral hydrate intravenously, sedatives, hypnotics and chloretone rectal injections (15 recoveries out of 17). He has had no chance of using antitoxin as a prophylactic. Details of the treatment follow. The antitetanic serum was given intravenously in 3,000 units "or more" daily.

A. G. B.

DÍAS (Ezequiel C.). Adenomycosis.—*New Orleans Med. & Surg. J.* 1918. Jan. Vol. 70. No. 7. pp. 598–605.

The author, who writes from the Oswaldo Cruz Institute, Brazil, states that the causative agent of Hodgkin's disease, pseudoleukemia, etc., is an extraordinary polymorphous fungus, which is found in the lymphatic ganglia of the patients, is cultivable, and is pathogenic for laboratory animals. In view of this etiology, the name of Adenomycosis may be given. He believes that leukemia is also a mycosis.

A. G. B.

BATES (Lewis B.). Smallpox on the Isthmus.—*Proc. Med. Assoc. Isthmian Canal Zone.* 1916. July to Dec. Vol. 9. Pt. 2. pp. 89–94.

In the period of the French Company smallpox epidemics were severe; in 1902 there were 183 deaths. The Americans took over in 1904 and since 1906 there have been 13 cases with one death. Twelve of the patients were brought to the Isthmus on merchant vessels and one case originated there. A resumé of the 12 cases is given and the last is described in detail, that of a negro with "marked skin lesions" but practically no fever. As it was thought that the case might be one of severe chicken-pox FORCE and BECKWITH's test was applied.*

"It consists in obtaining simultaneous cutaneous allergic phenomena in a previously vaccinated animal at both the site of intracutaneous inoculation with vaccine and at the site of intracutaneous inoculation with suspect's vesicle or pustule contents; an unvaccinated animal similarly injected showing negative results. Calves, rabbits, or guinea pigs may be used." A reaction takes place in 24–48 hours.

A recently vaccinated and an unvaccinated calf were used for the test. The allergic reaction was positive which "would seem to indicate its further trial when opportunity presents."

A. G. B.

HOWARD (Robert). Some Notes on Scrotal Operations in Negroes.—*Jl. Trop. Med. & Hyg.* 1918. Mar. 15. Vol. 21. No. 6. pp. 57–60.

The author as Medical Officer, Universities' Mission to Central Africa, has practised in Zanzibar for six and a half years; the patients were mainly Swahilis. Previously he was ten years in Nyasaland, where filariasis does not occur except in certain circumscribed localities. The night blood of male hospital patients (one slide) has been examined in each year, 788 in all with 249 infections, or 31.6 per cent. Acute filarial orchitis and funiculitis are common; of 14 cases 7 resolved and 7 ended in abscess. Lymph scrotum is fairly common. For elephantiasis scroti 40 operations have been done; microfilariae were found in 4 cases. The author gives the technique of his operation. Hernia was a complication in 8 cases and in these a radical cure was usually done first as a separate operation.

Inguinal hernia is very common; 85 operations have been done and in 37, or 43.5 per cent., microfilariae were present. The right side was affected 58 times to 16 of the left. Nearly all cases are acquired and

* *Jl. Amer. Med. Assoc.*, 1915, Vol. 65, p. 588.

heavy work does not seem to be a factor. The author is inclined to incriminate filariasis. "Lymphatic varix of the spermatic cord must dilate the inguinal canal, and the acute swelling of filarial funiculitis is often seen extending right up to the external ring." The preponderance of cases on the right side, confirmed by Dr. WALLER of the Government Service, is unexplained. In operation there has been "marked thickening of the sac and overhanging tissues," partly attributable to previous attacks of filarial inflammation of the cord. Howard does Bassini's or Halstead's operation. Among the patients in Nyasaland hernia was very rare.

Hydrocele is very common in Zanzibar, rare in Nyasaland. They are large, and inflammatory changes are generally present. The injection of carbolic acid liquefied with glycerin has been tried in 62 cases; of 28 cases traced 16 were possibly cured and in 12 the result was a failure. Sixty cases were treated by open operation.

Haematocele is not infrequently seen and in nearly half the cases occurs insidiously as a primary disease.

A. G. B.

DE LANGEN (C. D.). *Indische Galsteen*en. [Gallstones in the Tropics.] —*Geneesk. Tijdschr. v. Nederl.-Indië*. 1917. Vol. 57, No. 6. pp. 810-812.

In response to a request sent out the author received, during the course of a year and a half, 15 gallstones from various professional colleagues. All had been removed post mortem, and in only one case had the diagnosis of cholelithiasis been made during life. Two of the stones were submitted to analysis, and show the extremely low percentage of 3.0 and 11.2 per cent. of cholesterin respectively. In 4 cases only out of the 15 were the stones in the bladder, the remainder being found in the ducts, or in the substance of the liver; out of 422,943 patients treated in Government hospitals during a period of 10 years, the diagnosis of gallstones could only be confirmed in 30 instances. [For the incidence of gallstones in West Indians see this *Bulletin*, Vol. 6, p. 424, where 4,088 should be 1,088.]

J. B. N.

STANLEY (Arthur). *Scarlet Fever in the Far East*.—*China Med. Jl.* 1918. Jan. Vol. 32. No. 1. pp. 1-6.

According to Dr. Stanley, the Health Officer of Shanghai, scarlet fever is "generally prevalent in the Yangtse Valley at least as far up as Hankow, also in the North in Chefoo, Tientsin, Peking and Manchuria." At Hong Kong between 1908 and 1916 fifteen cases were notified. Other parts of China are not mentioned. The disease first appeared at Shanghai in 1873, and probably reached Japan about the same time. A table shows the incidence in the foreign settlement at Shanghai and in Japan between 1873 and 1897 in quinquennial periods and after that yearly to 1916. The largest mortality in the foreign settlement (1,527) occurred in 1902, and there has been a tendency to quinquennial periodicity. In 1916 there were 243 deaths in the foreign settlement. The disease is of virulent type with a mortality among foreigners of 15.4 per cent. It is at its maximum in the spring and its minimum in the autumn. As regards prevention the outlook is not regarded as hopeful.

A. G. B.

PIJPER (A.). A Case of Nocardiasis. — *Folia Microbiologica*. 1917. Dec. Vol. 5. No. 1. pp. 50-53. With 1 plate.

The patient was a white South African of 36, who had suffered from chronic cough for eleven years. The physical signs were those of chronic bronchitis, moist rales being audible everywhere. The sputum, which was muco-purulent, contained many lung cells in which were included masses of bacteria, long and short and sometimes coccus-like. Growth was obtained twice on agar, whitish colonies increasing very slowly, becoming yellowish and hard like cartilage, corrugated and very adherent to the medium; the fungus was Gram positive, not acid fast and non-motile. Its characters, macro- and microscopic, are shown in the plate. It was pathogenic for guinea-pigs.

A. G. B.

STANNUS (H. S.). Causes of Dental Caries. Some Observations on the Native African.—*Brit. Dental J.* 1917. Sept. 15. 11 pp.

Dr. Stannus examined the whole population of a series of villages in the West Nyasa District of Nyasaland. They were Atonga, "a cleanly tribe, living a natural life." Their diet was chiefly cassava made into porridge and some eaten raw, other constituents being ground-nuts, fish, a little maize or millet, flour porridge, green vegetables and bananas. Of 1,311 persons examined (1,038 adults) 8.6 per cent. showed caries, men and women, adults and children, in fairly equal proportion. Among the 113 with dental caries there were 142 carious teeth; 84 had one tooth affected, 27 had two and only 2 had three. A table shows the distribution of the carious teeth: the incisors and canines were free; the lower jaw was affected rather than the upper in the proportion 5:2; the greatest incidence was on the six-year-old molar of the lower and then of the upper jaw; where a single tooth was affected it was nearly always a lower molar and commonly the first. Among more educated sections of the native community caries is commoner. The author reports on 189 male prisoners and 54 native troops with 4 to 25 years service. Of these men, living under partly civilised conditions, 18 had caries.

"To sum up, my observations, though small in number, go to show that:

"(1) Native Africans have no immunity to dental caries.

"(2) The same causes and predisposing conditions are the source of caries among them as among people of civilized countries.

"(3) The small comparative incidence of caries among natives living under their natural conditions is due to the absence in large proportion of those predisposing conditions found in civilised races, irregular dentition, lack of proper mastication, want of use of the teeth owing to soft foods eaten.

"(6) Though a natural mode of life will probably in a large number of cases secure freedom from caries, some artificial means of cleaning the teeth appears to be a necessity.

"(7) The natural cleansing of the teeth is illustrated by the lower frequency of caries in the teeth of the upper jaw as opposed to those in the lower owing to the action of gravity.

"(8) The greater incidence of caries in the six-year old molar is due, it is suggested, to the fact that being the first of the permanent teeth it has to survive a period when the individual has not learned to care for his teeth."

A. G. B.

HEDBLÖM (Carl A.). On the Incidence of Appendicitis in China.—*China Med. Jl.* 1918. Mar. Vol. 32. No. 2. pp. 105-110.

There is a general impression among medical men practising in China that appendicitis is rare in the Chinese. The author, writing from Shanghai, doubts this. Out of 700 consecutive admissions to the Hospital of the Harvard Medical School of China there were seven cases, three of which were confirmed at operation and one at autopsy. Studying the Annual reports of 27 hospitals in China he found that out of 328 laparatomies appendectomy formed 12 per cent., from which and other evidence he would conclude that appendicitis is of relatively frequent occurrence. What is of more importance, however, is to ascertain its relative frequency as compared with other intra-abdominal lesions, as peptic ulcer and gall-stones, occurring in Asiatics.

A. G. B.

i. CASAUX (J.). Au pays du trachome.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1917. Dec. Vol. 8. No. 2. pp. 63-84.

ii. TALBOT. La lutte antitrachômateuse. Assistance et Prophylaxie.—*Ibid.* pp. 88-93.

i. This long paper is called forth by that of TALBOT who gave statistics of trachoma as met with at a Hanoi hospital in 1916 [see this *Bulletin*, Vol. 11, p. 232]. The author's investigations were carried out in 1917 on the whole of the population of Nam-dinh, a province of Tonkin. The results are given in the table.

TABLE 5.

	Total examined.	Active trachoma.	Per Cent.	Subactive trachoma.	Per Cent.	Cicatricial trachoma.	Per Cent.	Total of positive cases.	Per Cent.
Natives attend- ing for vaccina- tion	6,602	2,049	31.03	434	6.57	1,125	17.04	3,608	54.65
School children	1,259	544	43.20	349	27.74	138	10.95	1,031	81.89
Prisoners	273	40	14.65	46	16.85	61	22.34	147	53.85
Recruits 1917	11,816	2,319	19.62	1,649	13.95	1,663	14.08	5,631	47.65
General results	19,950	4,952	24.82	2,478	12.42	2,987	14.97	10,417	52.21

It is noted that the schools were well managed and clean and that the pupils belonged to the better classes. The 19,950 came from a population of about a million. The author thinks that the endemic

index of trachoma for Tonkin would vary between 50 and 55 per cent. Statistics are then given of other countries and it is concluded that the Tonkin focus is equivalent to that of Egypt and consequently is one of the most intense in the world. Trachoma in Tonkin begins at 6-7 months and takes at once its chronic form. The young are much more affected than their elders. It may cicatrize and get well spontaneously. The cases of blindness attributable to it should not be estimated above 45 per cent. The damage it causes is chiefly due to superadded affections. The European population is free. The author proceeds to criticise at length TALBOT's proposals for the prevention of trachoma—mobile brigades—which he thinks would be useless in Tonkin. His own proposals he leaves for another occasion.

ii. Points out that in antitrachoma measures there are two factors which are often confused—(1) Treatment for the infected, to be given by itinerating hospitals. (2) Prophylaxis, in the schools, where inspection followed by compulsory treatment must be carried out as well as educational propaganda.

A. G. B.

SITSEN (A. E.). **Over levercirrhose in Indië.** [Cirrhosis of the Liver in the Indies.]—*Geneesk. Tijdschr. v. Nederl. Indië*. 1917. Vol. 57. No. 6. pp. 738-748.

A discussion of the frequency of cirrhosis of the liver in the Dutch Indies, as indicated by post mortem examinations. The author met with it 10 times in 193 autopsies at Soerabaya. The paper contains no features of striking novelty.

J. B. N.

BIGGS (J. M.). **Pharyngeal Haemorrhage due to Leeches.**—*Brit. Med. J.* 1918. Mar. 9. p. 287.

Two soldiers admitted to hospital in Palestine with diagnoses "haemoptysis" and "haematemesis." One had drunk from a running stream, the other from a well. There was hoarseness, cough and haemorrhage and eventually the leech was found in the mouth. A description of the leech, believed to be *Limnatis nilotica*, is added [cf. this *Bulletin*, Vol. 10, p. 103].

A. G. B.

GOMEZ (Liborio). **Mohammedan Medical Practice in Cotabato Province.**—*Philippine J. Sci.* Sec. B. Trop. Med. 1917. Nov. Vol. 12. No. 6. pp. 261-278. With 1 plate & 7 text-figs.

This is stated to be the first of a series of reports on the local medical practices in the Department of Mindanao and Sulu, Philippine Islands. A long list is given of the diseases and conditions recognized by the Maguindanaos, the chief Mohammedan tribe. We learn their views on the causation, prognosis and treatment of disease. There is an account of the medicines used, the native names only of plants being given, with illustrations of amulets; the treatment of wounds—they possess books and writings containing prescriptions; management of labour; and dentistry, in which they seem to have acquired some skill.

A. G. B.

MOLL (Arthur M.). **Animal Parasites of Rats at Madison, Wisconsin.**—*Jl. Parasitol.* 1917. Dec. Vol. 4. No. 2. pp. 89-90.

Twenty-five rats were examined. The parasites found were, *Haematopinus spinulosus* Burm., *Otenocephalus canis* Curtis, *Ceratophyllus fasciatus* Bosc, *Laelaps agilis* Koch, *Trichinella spiralis* Owen, *Heterakis spumosa* Schneider, and *Hymenolepis diminuta* Rudolphi, harboured by five. It is noted that over eighty species of parasites have been reported from the rat.

A. G. B.

AUSTREGESILO (A.). **Infectious Psychoses, especially in Tropical Diseases.**—*New Orleans Med. & Surg. Jl.* 1917. Dec. Vol. 70. No. 6. pp. 513-529.

A paper by a specialist for specialists. It is in the form of a translation which, if originally good, has suffered in the commitment to print; for example, "In meeting fields prepared by neuropathy, the infections hatch mental troubles, as there is nothing special in the various psychic manifestations of a pathological order"; and, "We know, since Lussani, that ankylostomyiasis secretes several toxic substances which, when introduced into the circulatory current, spread into the liquid atmosphere, wherein all of our anatomic elements live, and which is constituted by our internal centre."

A. G. B.

MASTERS (W. E.). **An Unrestricted Test Diet in the Tropics.**—*Jl. Trop. Med. & Hyg.* 1917. Dec. 1. Vol. 20. No. 23. pp. 265-266.

The author estimated the quantity of protein, fat and carbo-hydrate in his food for three consecutive days. The articles of diet are set forth. He is aged 33 and weighs 164 lbs., his occupation "somewhat sedentary," the locale Central Africa. The daily average was 2,877 calories, as against 3,000 usually given as the average for a man doing average work.

A. G. B.

MONROE (Frazer F.). **A Study of Infections of the Urinary Tract other than Venereal.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1916. July to Dec. Vol. 9. Pt. 2. pp. 18-25.

During the years 1910 to July 1916 the author has obtained positive cultures from the urine of patients at Ancon Hospital containing microscopic pus, with symptoms on the part of kidney or bladder, in 290 cases.

					Cases.	Per cent.
<i>Bacillus coli</i> group	..	..	..	..	223	76.9
<i>Staphylococcus aureus</i>	..	..	..	..	22	7.6
<i>Bacillus pyocyaneus</i>	..	..	..	..	11	3.8
<i>Staphylococcus</i> group (excluding <i>Staphylococcus aureus</i>)	..	..	..	..	9	3.4
Gram positive organisms unclassified	..	..	..	..	23	7.9
Tubercle bacilli	..	..	..	..	1	.3

The urine was collected so as to avoid contamination. Dr. L. B. BATES conducted the bacteriological work. Females with urinary infection greatly outnumbered males; in 25 cases the infection was a complication of pregnancy. Of the *B. coli* group the symptom complex is pyelitis or pyelocystitis. The bacillus reaches the urinary tract (1) by way of the circulating blood, (2) through the urethra and bladder and surrounding lymphatics to the pelvis of the kidney, (3) by direct infection from colon to kidney through the lymphatic spaces. No. (2) is believed to be the common method, to be explained by rectal contamination "especially in female children when the common habit of wiping from behind forward with a diaper which contains fecal material obtains." Possibly stasis or some local lowered resistance in the urinary tract must be present before the colon organism becomes pathological there. The author had two instances of (1), and with regard to (3) it is noted that the right kidney and lymphatic spaces are in close communication with the bowel and the right kidney in this series was affected in 67 instances to 20 of the left kidney. The symptoms are detailed and a practical account is given of prevention and treatment. The author emphasizes the importance of a systematic examination of the urine in all cases of undiagnosed and continued fever, more especially in young children, and women during the child-bearing period. Statistics of age and race are not given.

A. G. B.

WOLBACH (S. B.), SISSON (W. R.) & MEIER (F. C.). **A New Pathogenic Sporotrichum. Found in a Case of Acute Arthritis of the Knee following Injury (*Sporotrichum councilmani*).**—*Jl. Med. Res.* 1917. July. Vol. 36. No. 3. (New Ser. Vol. 31.) pp. 337-355. With 4 plates.

The new *Sporotrichum* was grown from the knee of a boy who entered hospital at Boston, Massachusetts. Aspiration brought away "light brown peculiarly mucoid fluid" with numerous pus cells. Cultures made on plain agar showed a profuse fungus-like growth. The diagnosis was confirmed by positive complement fixation and agglutination tests. Lesions were produced in various laboratory animals, the injection material consisting of hyphae and spores. The distinguishing characters of *S. councilmani* are: "(1) Its pleomorphic growth, characterized by a free aerial growth of hyphae; (2) the abundant spore formation, large size of the spores and absence of lateral spore clusters, and (3) the occurrence in lesions as septate branching filaments.

A. G. B.

HESS (Alfred F.) & UNGER (Lester J.). **The Diet of the Negro Mother in New York City.**—*Jl. Amer. Med. Assoc.* 1918. Mar. 30 Vol. 70. No. 13. pp. 900-902.

A paper by these authors on the Prophylactic Therapy for Rickets in a Negro Community was summarised in this *Bulletin*, Vol. 11, p. 221. Here we have an account of the diet of the mothers. A study of the composition and caloric value of twenty dietaries showed an excess

in the intake of protein, an adequate consumption of carbohydrates and a deficiency of about 25 per cent. of fat. The dietaries of 75 women, the mothers of babies receiving cod liver oil, were then studied day by day for 179 days and the results are summed up in tabular form. The diet was deficient in milk and in fruit and vegetables; moreover the vegetables were taken chiefly in a dried or canned form. The New York diet therefore is deficient in calcium as well as in accessory substances. Most of these negroes came from the West Indies where the diet consists largely of fresh vegetables and fruit, and here rickets is almost unknown. It is suggested that this change in diet "may well alter the metabolism of the mother and her offspring."

A. G. B.

CLARK (Herbert C.). **A Consideration of Joint Lesions found in 832 Autopsies. Syphilis, Arteriosclerosis, and Occupation Important Etiological Factors.**—*Proc. Med. Assoc. Isthmian Canal Zone*. 1916. July to Dec. Vol. 9. Pt. 2. pp. 101-115. With 2 plates.

In 1913 BAETZ published a study of 100 cases of acute arthritis among the negro labourers of the Panama Canal Zone; he found that 63 were due to syphilis, 93.6 per cent. of these giving a positive Wassermann [see this *Bulletin*, Vol. 6, p. 429]. His paper was the occasion of the present study. The shoulders, hips and knees were selected for routine examination in 832 consecutive autopsies, a Wassermann test being made where possible; of these 115, or 13.8 per cent., showed joint changes, indicating that "silent lesions" may occur in these structures. Details of each case are given in a long table, wherein it is seen that the great majority were male negroes from the West Indies; it includes also 35 female negroes, chiefly domestic servants or laundresses, and three Europeans. The author divides the cases into three groups, (1) syphilis, 62 cases; (2) arteriosclerosis, 21; and (3) other causes, 32 (including 10 gonococcus). The Wassermann blood test was carried out by L. B. BATES; it was positive in 42 of the syphilitic group and negative in 14; in the other groups there were no positives. In the syphilitic group where the Wassermann was negative there were well recognised tertiary lesions. In that group the knees were affected in 42 instances, the knees and hips coming next with 6; in the arteriosclerosis group in 12 instances, knees and shoulders coming next with 5. Several reasons for this incidence on the knee are given, the chief being joint pressure; many of these patients were accustomed to carry large burdens on the head. The changes found are—a granular red slightly thickened membrane, a "pouting yellow shredded area" in the cartilage, where the greatest pressure is most continuously applied, and finally a complete loss of cartilage and exposure of cancellous bone. There is rarely any external evidence. The process begins with endarteritis or arteriosclerosis lessening the blood supply to the joint; the lesion is not really an arthritis but a degeneration. It is believed that the employment of other tests would have increased the syphilitic group.

A. G. B.

GARCIA DE QUEVEDO (L.). **La anemia de Puerto Rico y sus causas.** [Anaemia in Porto Rico and its Causes.]—*Bol. Asoc. Med. Puerto Rico*. 1915. June. Vol. 11. No. 107. pp. 88-97.

According to the author of this paper, anaemia is widely prevalent among the rural inhabitants of Porto Rico, and is due not only to uncinariasis, against which there is an organized official campaign, but also to intoxication by all the other intestinal worms, and to dyspepsia produced by caries of the teeth, from which 85 per cent. of children and young persons suffer, and lastly to chronic constipation, which is a very prevalent complaint, due to insufficient or defective diet. In addition there is the cachexia due to malaria.

J. B. N.

MEYER (C. H. L.). **An Epidemic of Jaundice in the Waziristan Field Force.**—*Indian Med. Gaz.* 1917. Dec. Vol. 52. No. 12. p. 425.

Cases began to appear in June and increased up to the middle of September; 300 were noted, British and Indians in about equal ratio. In many cases the symptoms were those of catarrhal jaundice. There was fever, usually mild and of short duration; enlargement of the liver (50 per cent.); enlargement of spleen (25 per cent.); jaundice, lasting one to four weeks. Three cases ended fatally with vomiting, great restlessness, delirium and coma; Glen LISTON reported of the liver of one, which weighed 40 oz. only, that the microscopic appearances were those of acute yellow atrophy. The methods of investigation appear to have been thorough but nothing definite resulted. The author thinks the epidemic was one of "Camp Jaundice," such as occurred in the South African campaign, and that it was due to a bacterial infection. Of spirochaetal infection there was no evidence.

A. G. B.

BREINL (A.) & PRIESTLEY (H.). **Notes on a Case of Antimony Poisoning.**—*Jl. Trop. Med. & Hyg.* 1918. Feb. 15. Vol. 21. No. 4. pp. 38-39.

An Australian aboriginal aged about 22, suffering from ulcerative granuloma, received tartar emetic intravenously in normal saline on alternate days, at first 0.08 gm.; this was increased after two days to 0.1 gm. and after other two to 0.12 gm. until 1.74 gm. had been given. The day after the last injection he had nausea and vomiting, and on the third day he became delirious with temperature 101° F. and violent vomiting, first of bile and mucus, later of blood, death ensuing in 64 hours. Post mortem there was widespread fatty degeneration of the liver with focal necroses; in the kidneys lesions corresponding to acute interstitial nephritis; other organs normal; no albumin in the urine.

A. G. B.

GAUDUCHEAU (A.). **Doubles vaccinations.**—*Bull. Soc. Méd.-Chirurg. Indochine*. 1916. Oct. Vol. 7. No. 8. pp. 306-316.

In these experiments, on rabbits, the author made use of a bacillus which he has called the paratyphoid bacillus of Nam-dinh [this *Bulletin*,

Vol. 11, p. 457], and which is somewhat pathogenic for that animal. He injected killed or living cultures of this and of a cholera strain in various successions or simultaneously in each series of two or three animals, and about 12 days later a living culture of the paratyphoid bacillus; he estimated the results by weighing the animals, on the assumption that the loss of weight is proportionate to the gravity of the disease. The results are set out and discussed. The animals which received the killed cholera strain a day after the living paratyphoid showed most resistance, manifested by a marked gain in weight 17 days after the test inoculation, whereas in most groups there was a loss of weight, and it is concluded that in these experiments the cholera inoculation favoured the reaction of the rabbits against the subsequent paratyphoid inoculation, a non-specific vaccino-therapeutic effect. Besides the order of inoculation there is the question of dosage to be considered and the author concludes that more experiments of the kind would lead to interesting results.

A. G. B.

WELLS (H. Gideon) & PERKINS (Roger G.). **Observations on Medical Conditions in Roumania.**—*Jl. Amer. Med. Assoc.* 1918. Mar. 16. Vol. 70. No. 11. pp. 743-753. With 16 figs.

The authors of this interesting paper were members of the American Red Cross Commission to Roumania. In December 1916, 4 months after the entry of Roumania into the war, Moldavia contained a nearly doubled population of exhausted, demoralised, underclothed and underfed people for whom the available supplies were quite inadequate.

The first epidemic disease to appear was cholera, which was soon brought under control by vaccination. In January typhus appeared and with it, or a little before, relapsing fever.

It is believed that nearly a million were infected with typhus and a graphic account is given of its ravages. The mortality was about 20 per cent.; 200 doctors working in the hospitals died. The disease was of predominatingly nervous type.

"The number of cases of severe nervous lesions that we saw in the hospitals six months after the epidemic gives striking evidence of the profound injury to the nervous system, both central and peripheral. There are cases of actual hemiplegia, with and without partial aphasia, severe psychoses, and especially many paralyses with atrophies of the shoulder girdle and upper limbs. Devaux says that there are probably 200 cases of atrophy of the forearm, usually resulting in a typical *main en griffe*."

In September only scattered cases were found. Relapsing fever subsided about a month earlier; it affected the rural population relatively much more than the city population. The mortality was about 10 per cent. Many patients were lost from cold and starvation. An account is given of the extermination of vermin, which seems to have been quite efficient in the army though less so among the civil population.

Typhoid was extensively present in the summer. The infection was attributable to carriers rather than infected water supplies. Flies swarmed.

"Presumably the conditions would be much worse but for the extensive prophylactic vaccination that has been practised. Here, as elsewhere,

the value of this procedure has been repeatedly and abundantly demonstrated. An especially striking case is furnished by the present high incidence of typhoid among the Roumanian officers; for example, in one hospital there were 156 cases of typhoid, of which 100 were in officers and but fifty-six in private soldiers. The reason for this lies in the fact that for soldiers vaccination was compulsory, but optional for the officers, and many of the latter refused it because of the temporary discomfort."

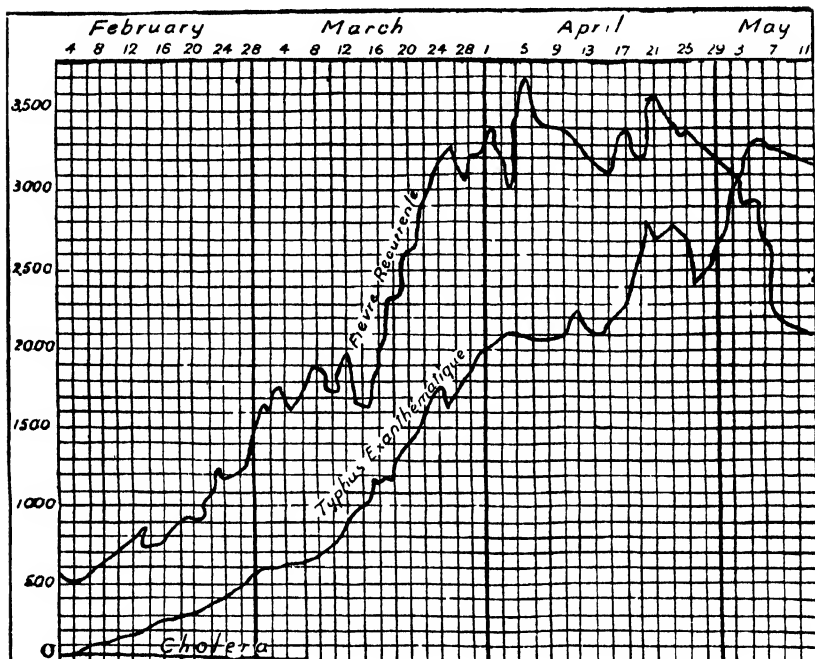


Fig. 2.—Incidence curves of typhus and relapsing fever in the Second Roumanian Army. The parallel character of the curves is of interest in view of the fact that both are louse-born diseases.

[Reproduced by permission from *The Journal of the American Medical Association*.]

There was also a widespread epidemic of a mild form of icterus—two or three hundred thousand cases. Of deficiency diseases, the authors write, pellagra is always prevalent in Roumania. The disease is now exceptionally so and universally acute. Its frequent appearance in young children is said to be new. A severe form of oedema was prevalent among the refugees; 50 per cent. were said to recover on a proper diet.

A. G. B.

TROPICAL DISEASES BUREAU.

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[No. 3.

SLEEPING SICKNESS.

MASTERS (W. E.). The Symptomatology and Treatment of Human Trypanosomiasis in the Lusanga Area, District Dukwango, Belgian Congo. A Report based upon 370 Recorded Cases and 6,200 Intravenous and Intramuscular Injections.—*Jl. Trop. Med. & Hyg.* 1918. Jan. 15 & Feb. 1. Vol. 21. Nos. 2 & 3. pp. 13-17; 25-31. With 1 diagram.

In these two articles a record is given of a dreadful state of affairs prevailing at the present time in the Lusanga area of the Congo, of which Leverville is the centre. The author's observations were made during the three years 1915 to 1917. The European population of the district averages about a hundred and the native population is presumed to be between one and two hundred thousand.

Referring to the native population Masters writes :

"Sleeping sickness carries them off one by one until the village has been 'wiped out,' the houses fall into decay, the bush rapidly overgrows the site, and travellers are only notified of its former existence by the broken pots on the numerous mounds of earth. Villages of 5,000 inhabitants are very rare, and 50 per cent. of these people have been found infected with trypanosomiasis. Small villages of twelve to twenty huts are the rule. I have seen chiefs upon whom the disease has laid its hand, with no people to rule except a handful of skeleton wives.

"Amongst the young, apparently healthy male adults, 72 per cent. were found to be infected with trypanosomes by glandular palpation (3,000 examined). Of those patients admitted to hospital for diseases other than trypanosomiasis, 74·8 per cent. were found to be infected upon the first examination of fresh blood, hence the microscopical examination suggests that the percentage assumed to be infected by glandular palpation was too low."

In the author's opinion the disease is much more widely spread than is believed by various local authorities. Sleeping sickness is responsible for 74·3 per cent of all deaths occurring at and around Leverville.

Trypanosoma gambiense is the organism responsible for the epidemic ; the tsetse found were *Glossina palpalis* var. *fuscipes* and *G. tabaniformis* (*fuscipleuris* ?) ; the following *Tabanidae*, *T. maculatissimus*, *T. brumpti*, *T. billingtoni*, *T. canus* and *T. ruficrus* were also found.

Writing on symptomatology Masters states that this in whites and blacks is by no means identical. He has never observed in

blacks the following symptoms which were commonly seen in whites :

"(1) Mottling of the skin of the abdomen, trunk and extremities. (2) An erythematous eruption, transient in duration and tender to the touch. (3) Deep tenderness of the muscles and bones. (4) Excruciating pains in the calves of the legs and ankles, causing some patients to be sent to me as beriberi patients. (5) Frequency of micturition. (6) Primary initial fever has not been distinctly observed by me in natives except in rare cases, although it may have been present before they applied to me for treatment."

There follows a long account of the symptoms as seen in Europeans and in natives :

SYMPTOMATOLOGY IN EUROPEANS.—Length of incubation period is uncertain. Initial fever is not always present; but nervous exhaustion, weakness, headache, frequency of micturition, sleeplessness, enlargement of lymphatic glands and congestion of the conjunctival vessels are early and important symptoms. During this period or later there are :—

Cutaneous disturbances. A blue mottling discoloration of the abdomen is almost pathognomonic; erythematous and vesiculopapular eruptions also are seen. *Kerandel's sign* was noted. *Oedematous patches* which are painful may occur on any part of the body.

Vascular manifestations. The author advocates the repeated searching of thick fresh blood preparations for trypanosomes but states that "one can mistake microfilariae for trypanosomes in unstained preparations, but they are much larger and slender in movement." [This warning is rather unfortunate as it is scarcely necessary to observe that such a mistake is hardly possible for any but the most inexperienced tyro.] Auto-agglutination is considered important but not pathognomonic as it occurs in other diseases, and is only of importance when they can be excluded [which diseases it is not stated].

Polyadenitis is more or less general and trypanosomes are easily found on gland puncture. *Eye symptoms.*—Iritis and iridocyclitis may necessitate the removal of the eye. *Weakness* is out of all proportion to the febrile symptoms and is persistent in spite of a good appetite. *Orchitis* has been noticed.

SYMPTOMATOLOGY IN NATIVES.—The first phase of the disease in natives need not be accompanied by any morbid manifestation. In certain persons trypanosomes may be constantly found in the blood without any other indications of disease.

There are two stages of the disease often with a latent phase between them.

1. The trypanosome fever stage characterised by polyadenitis, intermittent irregular fever, tachycardia, enlargement of the spleen, cutaneous eruptions and weakness.

2. The sleeping sickness stage proper characterised by an aggravation of the several symptoms, wasting, weakness, nervous disturbances, such as trembling, paralysis, apathy, somnolence, lethargy, hallucinations, mania and coma.

The duration of the first phase varies from one to several years; it is notably shorter in whites than in blacks. The latent phase lasts from six to eight months before the onset of the nervous symptoms,

whilst the duration of the final stage is four to eight months, rarely one year, but in treated cases it may last as long as one to two or even four years.

Treatment. The following combined treatment was employed:—

Orally.

R. Tart. emetic	gr. $\frac{1}{2}$ (0·06 gm.)
Caffeine	gr. ii (0·12 gm.)
Tartaric acid	gr. v (0·30 gm.)
Tinc. opium	m. v (0·30 cc.)
Tinc. nux vom.	m. v (0·30 cc.)
Aq. chlorof. ad. . . .	oz. i (30·00 gm.)

One ounce is given thrice daily in plenty of water, the dose increased if possible.

Intramuscularly. Soamin, 0·25 to 0·77 gm., was given every five days.

Intravenously. Tartar emetic was given intravenously. The dose administered was 4 to 12 cc. of a 2 per cent. solution, commencing with the smaller quantities and increasing by 1 cc. each time until toxic symptoms were produced; the dose was then decreased by 1 cc. and maintained at that level. The injections were given every other day. After five weeks' treatment the patients were given a week's rest.

Of the 370 patients treated, 160 died or left hospital before having received three injections. The results in the 216 recorded cases are given in the following table:—

Recovered. No trypanosomes found on repeated examination	8	3·9 per cent.
Improved, but trypanosomes ..	60	27·9 „
Unimproved	42	19·4 „
Died	81	37·3 „
Still under treatment, but trypanosomes still found ..	25	11·7 „
	216	100·0 „

Details are given in a table of 22 apparently healthy patients in the first stage of the disease who received the combined treatment (tartar emetic intravenously, tartar emetic orally, and soamin or atoxyl intramuscularly), the amount of the drugs received by each patient being recorded. The results, at the end of six weeks, are as follows:—

Cases that did not show any trypanosomes	12 or 54 per cent.
Cases showing fewer trypanosomes and some general improvement ..	5 „ 23 „
Cases showing no improvement ..	5 „ 23 „
Cases the worse for treatment ..	nil

22 or 100 per cent.

W. Yorke.

VAN DEN BRANDEN (F.). *Essais de traitement de la trypanosomiasse humaine par l'émétique huileux.*—*Bull. Soc. Path. Exot.* 1918. May. Vol. 11. No. 5. pp. 379-382.

Tartar emetic was given intravenously in a 4 per cent. suspension in olive oil, or in oil of ground nuts or liquid paraffin. None of the patients complained of pain at the site of injection but in all it was followed by violent coughing which lasted 15 to 30 minutes; the coughing was least violent in those injected with the paraffin suspension.

Nine cases of sleeping sickness were treated—six in good condition and with normal cerebro-spinal fluid, two in whom the cerebrospinal fluid was altered, and one in a very advanced stage of the disease. The dose of .0035 gm. per kilo. of body weight was generally well borne but in one case injection of this quantity (suspended in olive oil) was followed by fatal results and in another by haemorrhagic vomiting and other symptoms, all of which disappeared the following day; the urine however contained albumen 24 hours after the administration of the drug. The author therefore considers it dangerous to administer this dose (20 cgm.) of emetic in oil and is of opinion that the dosage should not exceed 15 cgm.

Details of treatment and the results are given in a table: three cases relapsed on the 21st, 22nd and 23rd days respectively after cessation of treatment; one case died after the second injection; one case disappeared during treatment; in one case the clinical symptoms were so grave that treatment had to be discontinued; one case died from trypanosomiasis during the course of treatment; and the other two had not relapsed up to the 82nd day. These had received 14 and 15 injections respectively. The conclusions are:—

(1) Suspensions of tartar emetic in oil present no advantages over the aqueous solution of the same product. They have neither a greater therapeutic action nor are they more readily tolerated by the human organism.

(2) The violent coughing which follows immediately after injection, the danger of intoxication by relatively small doses, and the inefficiency of its action seen in certain cases, are reasons for rejecting this method of administration.

W. Y.

BASSETT-SMITH (P. W.). *A Case of Trypanosomiasis with other Protozoal Infections contracted in the Cameroons, and some Observations on the Relationship of *Filaria diurna* with Calabar Swellings.*—*Jl. Trop. Med. & Hyg.* 1918. May 1. Vol. 21. No. 9. pp. 93-94.

A full account of the first year's observations on this case has already been reported [this *Bulletin*, Vol. 9, p. 29]. After discharge from hospital, Nov. 1916, the patient was found employment at the Medical School of the Royal Naval College so as to enable him to be kept under observation. He was treated with atoxyl, grains 5 twice weekly, but in May 1917, a relapse occurred. As the condition then became serious he was given an intravenous injection of antimony oxide (Martindale) grain $\frac{1}{2}$ and an intramuscular injection grain $\frac{1}{5}$ three days later, every week. The trypanosomes disappeared from

the blood and though up to December 1917, blood films were examined almost every day parasites were never again found and there were no fresh pyrexial attacks.

Calabar swellings were noted during the first year of the disease, and frequently an eosinophilia of 50 per cent., was present, but it was not until April 7, 1917 that diurnal sheathed filarial embryos were observed in the blood; since this date these embryos have constantly been found in small numbers, two or three in each film. In Feb. 1918, a living and mature *Filaria loa* was removed from beneath the skin in the chest wall.

Six white rats were repeatedly inoculated intraperitoneally with infected blood from the patient but in none of these were parasites found in the blood. Three guinea-pigs were also inoculated and two became infected; from both of them rats were inoculated but only occasionally were these subinoculations successful. A rabbit was infected by intravenous inoculation from one of the guinea-pigs.

The conclusions are :—

“(1) It would thus appear that this Cameroons strain is but slightly toxic, very difficult to transmit, and not always pathogenic, but when successfully started in white rats it may by passage become as fatal as the ordinary *Gambiense* form.

“(2) Intravenous inoculations of arsenic and antimony were not effective against malarial or filarial parasites, as these appeared in the peripheral blood during the treatment.

“(3) The Calabar swellings are definitely associated with the *Filaria diurna*, the latter only appearing in the blood fourteen months after infection, but the whole time causing a high eosinophilia.”

[It will be recalled that in his former paper the author associated the marked eosinophilia exhibited by this case with the trypanosomal infection.]

W. Y.

VILLELA (Eurico). *Fôrma aguda da doença de Chagas. Primeira verificação no Estado de S. Paulo.* [The Acute Form of Chagas' Disease. The First Case reported from the State of S. Paulo.]—*Brazil Medico.* 1918. Mar. 2. Vol. 32. No. 9. p. 65. With 1 fig.

A note, with photographic illustration, of a case of Chagas' disease in a child. The diagnosis was duly verified by blood examination. *Triatoma megista* was found in the dwelling house.

J. B. Nias.

TORRES (Magarinos). *Estudo do miocárdio na molestia de Chagas (fôrma aguda). I. Alterações da fibra muscular cardíaca.* [The Heart-Muscle in Chagas' Disease; Alterations in the Muscular Fibre.]—*Mem. Inst. Oswaldo Cruz.* 1917. Vol. 9. No. 1. pp. 114–139. With 2 plates.

The principal interest of this paper lies in the illustrations. The author shows, by careful micrometric measurements, that the multiplication of the characteristic leishmanial forms within the muscle-fibre bulges the sarcolemma and separates the fibrils, without otherwise damaging the fibre. The diameter of the individual fibres is thus increased from an average of 7μ to 12 or 13μ , at the point of infiltration. In addition a wide-spread waxy degeneration of

muscle-fibres occurs, but this is independent of the actual presence of leishmanial forms within the fibre. The material was obtained partly from the hearts of children who had died in the acute stage of the disease, and partly from inoculated dogs. The fixation was carried out with 10 per cent. formol, varied by sublimate-alcohol and Zenker's solution, and the sections, having been cut at a thickness of about 6μ , were stained with iron-haematoxylin.

J. B. N.

MAYER (Martin). Ueber den Dauerparasitismus von *Schizotrypanum cruzi* bei *Ornithodoros moubata*. [On the Length of Infection of *Ornithodoros moubata* by *S. cruzi*.]—*Arch. f. Schiff's- u. Trop.-Hyg.* 1918. May. Vol. 22. No. 9. pp. 158–160.

About 80 young tick larvae were fed for the first time on a mouse infected with *Schizotrypanum cruzi* on 10th and 11th June 1913. They have been kept at room temperature and fed on healthy mice at intervals of about three months. None of the mice became infected although living parasites (crithidia and trypanosome forms) were found in the faeces of the ticks. In 1918, four ticks were still alive and on 25th March one was killed and the heavily infected gut contents injected into a mouse which became infected. Hence the parasites in the gut of the tick were still virulent after five years. The progeny of the ticks were not infected, hereditary transmission being therefore so far unknown.

W. Y.

STEVENSON (A. C.). i. Trypanosomes in the Brain Tissue of an Experimental Guinea-Pig.—*Trans. Soc. Trop. Med. & Hyg.* 1917. Dec. Vol. 11. No. 2. p. 104. With 1 plate.

ii. The Presence of Trypanosomes in Brain Substance.—*Jl. Trop. Med. & Hyg.* 1918. Jan. 15. Vol. 21. No. 2. p. 17. With 1 plate.

A guinea-pig inoculated with what is believed to be *Trypanosoma nigeriense* shewed after about five and a half months some weakness of the hind quarters, which became more definite during the ensuing fortnight at the end of which the animal died. Histological examination revealed the presence throughout the brain substance of trypanosomes many of which were dividing. The locality of the parasites was not associated specially with the capillaries and smaller blood vessels. The trypanosomes were, if anything, most numerous in the mid-brain. Small-celled infiltration of the perivascular tissue was well marked, and masses of trypanosomes were seen in the same situation.

In a second guinea-pig, which died suddenly without symptoms four months after inoculation from the first, large numbers of trypanosomes were found in the blood-vessels of the brain but only a few in the brain substance itself. Perivascular infiltration was absent except for a small amount around the vessels of the pia-mater. Numerous capillary haemorrhages containing trypanosomes were found in the medulla: these the author considers may have been the cause of death. No Gram staining streptococci, such as are often found in sleeping sickness brains, were seen in the sections.

[It would have been interesting if the author had recorded the results of examination of the peripheral blood of the first animal. The demonstration of trypanosomes in the tissues as apart from the blood is obviously of great importance from several points of view. The fact was clearly pointed out by the reviewer seven years ago as a result of his work on the pathology of lesions of the cornea and skin in animals experimentally infected with *T. rhodesiense*.* He wrote: "The fact that trypanosomes can multiply so readily in the tissue spaces and at the same time be either entirely absent from the blood, or present in very small numbers only, is one of considerable interest, although the explanation is not very obvious. Perhaps the tissue juices form a more favourable nidus for the growth of the parasites, or possibly in these situations they escape to some extent the action of certain anti-bodies which have been shown to exist in the blood. Whatever the cause may be, the observation illustrates in what manner it is possible for an animal to be heavily infected and at the same time present no parasites in the peripheral circulation." (*Sleeping Sickness Bulletin*, Vol. 3, p. 220.)]

W. Y.

KRUMBHAR (Edward B.). **Experimental Trypanosomiasis: *T. equiperdum* Infection in the Dog.**—*Jl. Infect. Dis.* 1918. Jan. Vol. 22. No. 1. pp. 34-42. With 5 charts.

The author gives the following summary of his work—

"Dogs may be readily infected with *T. equiperdum* and a severe anemia be produced. The incubation period varies from 3 to 8 days, and a fatal termination results in from 3 to 7 weeks. By successive transmission through dogs the virulence of the infection may be increased so that both incubation period and duration of the disease may be shortened and the maximum anemia more quickly reached.

"With the appearance of trypanosomes in the circulating blood, the animals show general weakness, loss of weight, lethargy, and a lessened tendency to the healing of wounds. Subcutaneous edema is a common manifestation and may appear as a general anasarca or be limited to the genitalia or the extremities. The edema fluid contains living trypanosomes. Another interesting and almost constant lesion is keratitis. Choloria is constantly present without evidence of jaundice in the skin or mucous membrane.

"The anemia which develops is progressive and of the hemolytic type. The hemoglobin may fall to 40, and the red cells to less than 3,000,000 per c.c.

"Attempts at regeneration are shown by the increased number of skeined cells, occasional nucleated reds in the peripheral stream, and hyperplastic bone marrow at necropsy. That this attempt at repair is entirely inadequate, however, is shown not only by the progressive lowering of hemoglobin and erythrocyte count, but also by the leukopenia, diminution in platelets, later lowering of percentage of skeined cells, and disappearance of nucleated red blood cells from the peripheral blood stream.

"The principal pathologic changes are the usual degenerative lesions of anemia in the parenchymatous organs, hyperplasia of the bone marrow and a great enlargement of the spleen.

"Splenectomy at the height of the trypanosome infection has no beneficial influence, but rather the reverse, on the anemia or the course of the infection. Animals splenectomized before infection died more

* *Annals of Tropical Med. & Parasitol.*, 1911. Vol. 4. p. 385.

quickly than did those with intact spleen ; as a rule, within 2 or 3 days after the appearance of trypanosomes in the circulating blood.

"The intravenous injection of arsenobenzol, 3 injections at intervals of 3 days, has been followed by a disappearance of all symptoms and of trypanosomes from the blood and of a prompt improvement in the blood picture. In some instances, however, the disease has recurred on the discontinuance of treatment."

W. Y.

WOODS (Alan C.). & DE SCHWEINITZ (George E.). **Trypanosome Keratitis—an Experimental Study.**—*Arch. of Ophthalm.* New Rochelle. 1917. Sept. Vol. 46. No. 5. pp. 431-445. With 1 plate.

The authors do not add much to our knowledge of this subject. After summarising previous work dealing with ocular changes in trypanosomiasis [*Sleeping Sickness Bulletin*, Vol. 3, p. 218.] they record their own observations on the eyes of dogs infected with *T. equiperdum*. The following summary is given :—

"Ocular lesions occur constantly in dogs infected with the *Trypanosoma equiperdum*. These lesions are manifested clinically as a dense clouding of the cornea and an iritis with haemorrhages and exudates in the anterior chamber, with the occurrence of pericorneal injection and photophobia. The lesions are not caused by a general toxæmia, but occur synchronously with an actual invasion of the ocular humors by the trypanosome, and appear to be dependent upon the invasion of the ocular humors and the ocular tissues by the parasites. The ocular lesions are readily cured by repeated injections of arsenobenzol, the American reproduction of salvarsan.

"Pathologically, the corneal lesions are those of an interstitial keratitis with an actual invasion of the substantia propria by the trypanosomes. The lesions of the iris consist in a marked oedema of that tissue, with a rather dense cellular infiltration of mononuclear and polynuclear cells. The ciliary processes are themselves uninvolved, but occasionally they are embedded in a serofibrinous cellular exudate in which occasional trypanosomes are found. The retinal lesions consist of focal lesions characterized by a disarrangement of the retinal layers with a monocellular infiltration. Over these areas is a cellular exudate containing trypanosomes."

W. Y.

LAVERAN (A.). **Grande fréquence de la Kératite chez les chiens infectés par *Trypanosoma maroccanum* ; un cas de kératite ulcéreuse double.**—*Bull. Soc. Path. Exot.* 1918. May. Vol. 11. No. 5. pp. 375-379.

The author has worked with *T. maroccanum* obtained from two sources, firstly from Casablanca and secondly from Mazagan. He records that VELU has observed corneal opacity in 10 of 31 dogs infected with the Casablanca strain, and that DELANOË has seen the same phenomenon in one of three dogs inoculated with the Mazagan virus. Laveran inoculated three dogs with the former strain and all three animals developed keratitis ; he inoculated five dogs with the latter strain and four of them developed keratitis. Details of each of these experiments are given.

W. Y.

BLUMENTHAL (Franz). Ueber die Wirkung von Röntgenstrahlen auf *Trypanosoma brucei*. [On the Action of Röntgen Rays on *T. brucei*.]—*Berlin. Klin. Woch.* 1917. Sept. 17. Vol. 54. No. 38. pp. 918-920.

After summarising previous literature on this subject the author records his own observations on the effects of Röntgen rays, firstly in mice infected with *T. brucei* and secondly in suspensions of the living parasites in blood diluted with physiological salt solution. It was found that the rays had no definite action on the parasites in the living animal, although as the result of enormous doses of Röntgen rays there was a delay in the development of the infection. Injury to the organism was, however, so great that death of the mouse frequently occurred before the infection became manifest. If perchance the animal survived the first few days trypanosomes appeared in the blood. Probably the delay in the appearance of the parasites was more closely related to the severe blood changes wrought by the rays than to the direct action of the latter on the parasites. The experiments *in vitro* likewise failed to demonstrate any appreciable effect of the rays on the trypanosomes.

W. Y.

WOODS (Alan C.) & MORRIS (Harold H.). Complement Fixation in Experimental Trypanosomiasis.—*Jl. Infect. Dis.* 1918. Jan. Vol. 22. No. 1. pp. 43-48.

The authors examined the serum of a number of dogs infected with dourine by the complement binding reaction, with a view to determining: (1) the time of occurrence of the reaction; (2) the relationship of the reaction to the various symptoms and pathological changes; (3) the specificity of the reaction; (4) its relationship to the Wassermann reaction and (5) the effect of salvarsan on the reaction.

Details are given regarding the preparation of antigen by grinding up the spleen of a rat, heavily infected with *T. equiperdum*, in 30 cc. of normal salt solution, the emulsion obtained being filtered and titrated against two known negative sera and used in one third the anticomplementary dose provided this was not more than 1:6. The technique of complement fixation is also described. The results of the experiments are given in tables.

The conclusions are as follows:—

"Dogs infected with *T. equiperdum* develop complement fixation with a specific antigen within 8 days after inoculation. An easily prepared and a very satisfactory antigen is the salt solution extract of the spleen of a rat heavily infected with trypanosomes or dead from the infection. The complement fixation usually follows the appearance of trypanosomes in the blood, although it may occasionally precede the appearance of trypanosomes. The complement fixation, however, always antedates the appearance of symptoms.

"Dogs infected with trypanosomes frequently give a positive Wassermann reaction.

"Within 3 weeks after the appearance of trypanosomes in the blood, the serum of the infected dog becomes strongly anticomplementary. This anticomplementary phenomenon appears to be due to the liberation of anticomplementary substances into the blood by the invading trypanosomes.

"The blood is rendered sterile, and all clinical symptoms clear up following the intravenous injection of arsenobenzol, and in the only complete experiment at hand, the anticomplementary action and complement fixation properties with the trypanosome and Wassermann antigens likewise disappeared."

W. Y.

HARTMANN (M.) & NOELLER (W.). *Untersuchungen über die Cytologie von Trypanosoma theileri*. [Investigations on the Cytology of *Trypanosoma theileri*.]—*Arch. f. Protistenk.* 1918. Apr. 27. Vol. 38. No. 3. pp. 355–375. With 2 plates & 6 figs.

A somewhat technical paper dealing mainly with the morphology and divisional processes of cultural forms of *T. theileri*. As a result of their work the authors reach the conclusion that in *T. theileri* the blepharoplast and basal granules divide separately and that the old flagellum remains associated with one of the daughter basal granules, whilst from the other granule the new flagellum is formed. The paper, which is beautifully illustrated by plates and diagrams, should be consulted in the original by those interested.

W. Y.

CHATTON (Edouard) & BLANC (Georges). *Culture du trypanosome du gecko chez la punaise des lits*—*Bull. Soc. Path. Exot.* 1918. May. Vol. 11. No. 5. pp. 387–391.

As bed bugs readily bite reptiles and especially the gecko it would be interesting to know whether they can convey any of the various haematozoa which infect geckos: these are, a *Herpetomonas*, Leishmaniform bodies, *Trypanosoma platydactyli*, two species of haemogregarines, *Pirhemocytion tarentola*, one of the *Plasmodidae*, and a microfilaria. The authors have not had an opportunity of experimenting with the last two as they are very rare in southern Tunis; they state however that none of the first five, with the exception of the Leishmaniform bodies, appears to find in the bed bug a host in which it can accomplish its normal evolution.

The herpetomonas shows a tendency to culture in the bed bug but the trypanosome cultures readily in the intestine of the insect, much more readily even than in the best artificial media. The trypanosomes are free in the stomach and are motile in the partially digested blood. In general, the bugs which bite a particular gecko are either all infected or none of them are; hence it is by this means possible to determine the percentage of geckos infected. Of 57 geckos 46.6 per cent. were found to be infected by feeding bed bugs but only 14.4 per cent. by culture *in vitro*. The trypanosomes do not undergo any evolutionary transformation in the intestine of the bugs; the culture attains its maximum towards the fifth or sixth days and degenerates when digestion of the blood is complete. Trypanosomes are found in the stomach and first loop of the mid-gut.

The development of the trypanosomes of the gecko in the bed bug is a simple temporary culture in the extravasated blood of the gecko, which constitutes a favourable medium so long as it is not completely digested. The bed bug plays scarcely any part in the phenomenon except that by its intestinal secretions it prevents putrefaction of the blood.

W. Y.

TEAGUE (Oscar) & CLARK (Herbert C.). A Trypanosome of Panamanian Cattle and a Method for concentrating Trypanosomes in Peripheral Blood.—*Jl. Infect. Dis.* 1918. Feb. Vol. 22. No. 2. pp. 154-158.

A large percentage of the Panama cattle harbour in their blood a large non-pathogenic trypanosome resembling *T. theileri*. The trypanosome was not found in direct examination of blood films but only in cultures of defibrinated blood in broth at 26° C. In such cultures the parasites may live for 30 days or longer. Several methods to demonstrate the trypanosomes in the blood were tried, the following being finally chosen.

"The freshly drawn blood is whipped with wooden sticks in an enamel-ware cup and the defibrinated blood is poured through wire gauze to remove bits of fibrin. Ten cc. of the blood are added to 10 cc. of distilled water, and the two are thoroughly mixed. This was done at the slaughter house. Hemolysis of the red cells takes place in a few minutes. As soon as we reached the laboratory, the blood was centrifugated, the supernatant fluid was poured off and the sediment was emulsified in the 2 or 3 drops of fluid remaining. Smears from this sediment showed well preserved trypanosomes in almost every instance, from 1-10 or 12 or more to a slide having been found. A drop of the sediment examined under a cover slip occasionally showed a trypanosome, which remained actively motile for more than an hour after the distilled water had been added to the blood. There is a distinct advantage in defibrinating the blood before taking the red cells, as a smaller amount of distilled water is required and the sediment after centrifugation seems to be smaller in amount."

The conclusions are:—

"*Tr. theileri* occurs in a large percentage of beef cattle in Panama.

"It is present in such small numbers in the peripheral blood, that stained smears are uniformly negative.

"After defibrinating the blood, treating with an equal volume of distilled water and centrifugating, we find it almost always in smears from the sediment.

"Filaria are also readily demonstrated in the blood of Panamanian cattle by the same procedure, although they are very rarely found in ordinary blood films.

"The trypanosome is readily cultivated in broth at 24-26° C., but undergoes marked changes in morphology in the culture. Inoculation into other species of animals than cattle yielded negative results."

W. Y.

ITURBE (Juan). El emético en el tratamiento de la derrengadera. [Tartar Emetic in the Treatment of Derrengadera.]—*Gaceta Med. de Caracas.* 1918. Mar. 31. Vol. 25. No. 6. pp. 62-63.

The author finds that tartar emetic is perfectly borne by guinea-pigs inoculated with a virulent strain of the Derrengadera trypanosome, doses of 4 to 5 mgm. per kilo of weight. The trypanosomes disappear from the peripheral blood in 15 minutes. The blood of such a guinea-pig, injected into another guinea-pig a week after the inoculation, does not infect, but after an interval of 3 or 4 weeks will sometimes do so. Encouraged by this result the author injected 5 horses and mules infected with this trypanosome intravenously with doses of 1 to 1½ grammes of tartar emetic dissolved in 100 cc. of a 4 per 1,000 salt-solution. The dose was repeated every 5 days until the animals got well, and was tolerated perfectly.

J. B. N.

LEGER (M.) & PORRY (E.). *Trypanosomes nouveaux de deux singes de la Guyane française.*—*C. R. Soc. Biol.* 1918. Feb. 23. Vol. 81. No. 4. pp. 180–183.

The authors describe two new trypanosomes which they have found in South American monkeys, the first in *Ateles pentadactylus* and the second in *Midas midas*. In the following table the measurements of the two trypanosomes are given.

	<i>Ateles</i> <i>pentadactylus</i>	<i>Midas</i> <i>midas</i> .
Posterior extremity to centrosome	3	16·5
Centrosome to nucleus	4·5	4
Nucleus	2	3·5
Nucleus to anterior extremity ..	4·5	13
Length of body	14	37
Free flagellum	5	7
Greatest breadth	3	2

The trypanosome of *Ateles pentadactylus* is very scanty in the peripheral blood, which does not exhibit autoagglutination. Both extremities of the parasite are elongated, the centrosome is rounded and relatively large, the undulating membrane is well developed and there is a distinct free flagellum. The monkey was perfectly healthy and subinoculations into a tamarin monkey and a guinea-pig were negative.

The trypanosome of *Midas midas* is very rare. It is harmless to the tamarin monkey which it parasitises. Both extremities are tapering, the anterior less than the posterior, the centrosome is large and rod-shaped and stains deeply, the undulating membrane is narrow and there is a well developed free flagellum.

To the parasite found in *Ateles pentadactylus* the authors give the name *Trypanosoma lesourdi* and to that in *Midas midas* the name *Trypanosoma devei*.

W. Y.

SIMPSON (James J.). *Bionomics of Tsetse and other Parasitological Notes in the Gold Coast.*—*Bull. Entom. Res.* 1918. Feb. Vol. 8. Pts. 3 & 4. pp. 193–214.

This report is based on a tour, partly in the Northern Territories of the Gold Coast, and partly in Togoland, during the period September 1915 to February 1917. The nature of the country and the type of vegetation have already been described [this *Bulletin*, Vol. 4, p. 165].

The report is divided into twelve sections as follows:—

1. *Factors influencing the distribution and prevalence of Glossina.* In discussing the meaning of the expression “fly belt” the author writes, “In all my experience in West Africa I am not conscious of any definite locality, either in the wet or dry season, containing tsetse actually cut off from the surrounding country if the intermediate country be thoroughly examined, it will be found that tsetse exist linking up these so-called belts, though undoubtedly in smaller numbers.” During forest fires tsetse and game are driven to take refuge in the denser bush but pupae are seldom damaged and soon repopulate the area burnt, and the adults return after a

very short time. In the Northern Territories of the Gold Coast there is hardly a square mile where tsetse cannot be captured at some period of the year.

G. palpalis is found along banks of rivers where vegetation is dense and along the banks of the smaller tributaries; *G. tachinoides* is an up-country form found in similar localities. *G. submorsitans* is seldom found near rivers and is more abundant in the savannah forest and open country. LLOYD'S observation, that where game is plentiful 13 per cent. of female *G. morsitans* were caught, whereas where game is not plentiful 41·5 per cent. of females were taken, is confirmed—as also his observations that more pupae are found where game is plentiful. A close association exists between *G. submorsitans* and game all over the Northern Territories. Wherever game is abundant, so is the tsetse.

Humidity is the chief meteorological factor influencing the numbers of tsetse. At the beginning of the dry season *Glossina* increase greatly in numbers. A hot sun most strongly affects *G. palpalis*, which seldom follows one in direct sunshine, *G. tachinoides* is next affected, whereas *G. submorsitans* will follow and attacks in the open in the hottest sun, and were frequently caught in the open at a temperature of 109° to 112° F.

II. *Glossina palpalis* var. *pallida*, var. nov. This tsetse was first found by Simpson in the upper reaches of the Gambia in 1911, and was subsequently found in large numbers by MACFIE in the Ilorin province of Northern Nigeria. At Yapi (Gold Coast) Simpson again found it in large numbers. It is almost identical in size and markings with *G. tachinoides* but examination of the genital armature leaves no doubt as to its identity with *G. palpalis*.

III. *Food of Glossina*. A summary is given of previous work on the blood (mammalian and non-mammalian) found in *G. palpalis* and *G. morsitans*. At Yapi 1,289 *G. tachinoides* were captured containing blood; in 67·3 per cent. this was mammalian and in 32·7 non-mammalian. In other observations at different places the percentage containing mammalian blood varied from 59 to 74·3 per cent. and non-mammalian blood from 26·7 to 41 per cent. The author was not able to satisfy himself that tsetse imbibe water or any fluid other than fresh blood, either exposed or through a membrane of rat's skin. Experiments to get tsetse to absorb fluid from fruits were also negative. The percentage of mammalian to non-mammalian blood differs greatly in the case of *G. submorsitans*. Of 987 examined with discernible blood in the stomach, only 23 contained non-mammalian blood.

IV. *Disparity in the proportion of sexes in Glossina* After discussing previous work on the subject the author records numerous observations of his own. He writes that it is quite evident that there is a much greater disparity in the proportion of the sexes of *G. submorsitans* than in the case of *G. tachinoides*. The general average ranges from 90–95 per cent. of males but there are certain discrepancies, e.g., at Murugu in July the percentage of males was only 46, while in August it was 85. This is probably accounted for by the greater rainfall between June and August than in the preceding months.

V. *Flight experiments with Glossina*. *G. tachinoides* marked by cutting off the two terminal tarsi of various legs were liberated at

various distances from the river. In all 3,000 specimens were used; before being liberated the flies were, as far as possible, all fed. From these experiments the following deductions were drawn:—

“(1) The greatest distance covered by a single tsetse was four miles. (2) Apart from this none returned over two miles. (3) All seemed to return to the water, as none were caught at a greater distance from the river than where they were liberated. (4) If there was any intermediate water between where the tsetse were liberated and the large river, the tsetse discovered this and were making their way down stream to the large river. (5) Where there was shade on the bank of a stream but no water, the tsetse congregated there, but did not attempt to proceed towards the large river. (6) A thorough examination of the open bush on each side of the road revealed not a single tsetse at a greater distance than 200 yards. (7) There was practically no discrepancy in the proportion of the sexes recaptured; if anything, there was an excess of males, but the numbers were too small to be of value.”

Ten experiments were performed in order to determine how far tsetse will follow a herd of game. A herd of cattle passing along a road was selected and the tsetse liberated in the centre of the herd. In the first set of experiments the tsetse were not molested but in the second set a number of boys with fly switches were ordered to keep disturbing the flies when seen to alight. The result of these experiments were as follows:—

After one	mile	(1)	21	were recaptured.
„ two	miles	(2)	10	„ „
„ three	„	(3)	7	„ „
„ four	„	(4)	3	„ „
„ five	„	(5)	0	„ „
„ one	mile	(6)	29	„ „
„ two	miles	(7)	17	„ „
„ three	„	(8)	12	„ „
„ four	„	(9)	7	„ „
„ five	„	(10)	0	„ „

VI. *Trapping of Glossina.* Systematic trapping with bird lime was less satisfactory than by means of nets. Four colours of paper were used—light brown, red, black, and green; these are given in order of efficiency.

Of various substances smeared on the bodies of collectors only two, viz., beechwood creosote and beechwood oil acted as a deterrent to the flies.

VII. *Natural enemies of tsetse.* The stomach contents of guinea-fowl and bush fowl, and of lizards were examined but in no case were remains of either adult tsetse or pupa found. The same is true of nests of mason wasps. Dragon flies were seen devouring tsetse, but by far the most important insect enemies are Asilid flies and wasps of the genus *Bembex*. The Asilidae are the chief insect enemies of *G. tachinoides* and *Bembex* of *G. submorsitans*.

VIII. *Breeding places and habits of Glossina.* Reference is made to the work of ZUPITZA and of YORKE and BLACKLOCK on the breeding places of *G. palpalis*. A careful search in and around palms failed to reveal pupae of *G. tachinoides*. The most common situation for the pupa of this tsetse is the decaying humus beneath overhanging trees, in places which are quite sheltered from heavy rains, and which would be moistened only occasionally by water dripping over. The sun seldom or never penetrates to such positions, and the ground is never really dry. The principal breeding season of *G. tachinoides*

is just after the dry season. The breeding places of *G. submorsitans* are very similar to those of *G. tachinoides* with the exception that on several occasions pupae of *G. submorsitans* were found on the clusters of small growth on the top of deserted ant hills and twice under the overhanging rocks on a scarp at a bush camp.

IX. *Parasites of pupae of Glossina.* A small proportion of the pupae of *G. tachinoides* found were parasitised by *Chalcis amenocles*. The following parasites of *G. submorsitans* were found, given in order of frequency: *Chalcis amenocles*, *Dirhinus inflexus*, *Coelalysia glossinophaga*, a species of *Odontomyia* and a small Chalcid not yet worked out.

X. *Fauna of the Northern Territories.* Blood examination was made of a large number of domestic stock and fauna. The trypanosomes found were *T. pecorum*, *T. vivax* and a parasite belonging to the polymorphic group indistinguishable from *T. gambiense*.

XI. *Human trypanosomiasis.* Only two cases of human trypanosomiasis came to the author's notice—one was infected with *T. gambiense* and the other with *T. vivax*. [Details are given in Dr. MACFIE's paper (see this *Bulletin*, Vol. 9, p. 329 and Vol. 11, p. 162).]

XII. *Blood sucking Arthropods other than Glossina.* The Report closes with a long list of these Arthropods found by the author and grouped according to the locality in which they were found.

W. Y.

CHRISTY (Cuthbert). *Tsetse Flies and Fly-Belts.*—*Ann. Trop. Med. & Parasit.* 1918. Jan. 31. Vol. 11. No. 3. pp. 279-282.

After defining what he means by a "fly belt" the author writes as follows:—

"Within the belt, the fly has two forms of migration. One it is easy to explain. It is the annual movement, due to the burning of the bush in the dry season, to the streams, khors, wadis and moist places, where shade may be found and shelter obtained from the fire and smoke. For two or three months each year all the flies in a fly-belt are to be found in such places and not in the burnt bush. To enter or pass through these sanctuaries after 10 a.m. during this period is like fighting a swarm of fussy, angry bees. In the early morning one passes them with comparative impunity if noise and disturbance are avoided.

"Not until the first spring showers arrive and the burnt and blackened bush begins to take on its normal green appearance again do the flies leave their shelter for the open country

"The second form is that which goes on throughout the rest of the year, and is far more difficult to understand. One month the flies are there, but the next they are gone to some other part of the belt. So much we know, but what is not yet certain, is whether the fly has definite months of migration, that is, whether its local migrations take place at the same time each year or month, and what prompts them."

In the author's opinion wild animals play a small or no part in the mystery. That wild animals may be a reservoir for the trypanosome of sleeping sickness is not unlikely but to assume that they are the chief reservoir of the disease, because a trypanosome sometimes found in them cannot be distinguished microscopically from the trypanosome known to cause disease in man, seems to the author a most dangerous assumption. [Dangerous to whom or to what is not stated. In the reviewer's opinion, failing evidence to the contrary, it seems a logical assumption.] The author is convinced

that the antelopes play a quite negligible part in the transmission of disease to man. As a result of studying the life history of each animal, together with the daily life of the African native in a sleeping sickness area, Christy concludes that the pig (common red river hog, the wart hog and the semi-domesticated pig) is the chief culprit.

During his last journey in the Bahr-el-Ghazal and Congo the author examined the blood for trypanosomes of a large number of animals. From two to six fresh blood films were taken from each animal. Of 160 animals, giraffe, elephant, buffalo, duiker, pig, colobus monkey, etc., only 5 were found infected with trypanosomes and only one, a wart hog, had a species of trypanosome which resembled the human parasite. Three of the others were infected with a short active trypanosome of the *pecorum* type, while in the fifth one long thin trypanosome was observed. The number of animals infected may in reality have been slightly higher for it frequently happened that the slides could not be examined for some hours.

Other animals found infected [with what trypanosome is not stated] were the water buck and bush buck. Those most frequently examined were Jackson's hartebeest and the kobs. Trypanosomes were not found in any of the many buffalo slides examined. [It should be noted that these observations were made on fresh unstained blood films].

W. Y.

SCHWETZ (J.). A Comparative Study of the Habits of *Glossina brevipalpis*, Newst., *G. fusca*, West., and *G. pallidipes*, Aust. in the Belgian Congo.—*Ann. Trop. Med. & Parasit.* 1918. May 11. Vol. 11. No. 4. pp. 365-398. With 1 map and 1 chart.

The following are the author's conclusions:—

"1. The five important tsetse-flies—*G. brevipalpis*, *G. fusca*, *G. pallidipes*, *G. morsitans* and *G. palpalis*—select tree trunks, the larger branches of trees and lianes for resting purposes.

"2. In regions where they exist, *G. brevipalpis* and *G. pallidipes* are not restricted to limited areas or belts, but, like *G. morsitans*, are found uninterruptedly—except in large clearings—over vast stretches of country.

"3. The habits of *G. pallidipes* are intermediate between those of *G. brevipalpis* and *G. morsitans*. Like *G. brevipalpis*, *G. pallidipes* hovers over the ground when active and is usually so only at certain fixed times, especially between 3 p.m. and 5 p.m. (4 to 6 p.m. with *G. brevipalpis*), the maximum activity being reached about 4 p.m. The habits of *G. pallidipes*, however, are less well defined than those of *G. brevipalpis*, and it not only appears and bites more often than the latter, but is not uncommonly seen on the wing in very small numbers throughout the whole afternoon and occasionally in the forenoon. Of the *G. pallidipes* captured when active, only about 15 per cent. were females.

"4. In those regions where *G. brevipalpis* occurs it accommodates itself to all types of arborescent vegetation—forest, parkland and wooded savannah, but *G. pallidipes*, like *G. morsitans*, does not inhabit the forest.

"5. *G. fusca* occurs only in one kind of arborescent vegetation—forest. As the region where these observations were made (northern Katanga, notably the districts between the River Lualaba and the upper Lomami River) consists of parkland and savannah, the forest only being represented usually along rivers and streams, by belts of varying width, it is evident that in this region *G. fusca* only occurs in limited and somewhat restricted areas. Further, these areas are still more restricted owing to the fact that this species only inhabits moderately dense forest belts of a certain width (200 to 300 metres). But contrary to what has been thought

so far, where *G. fusca* does occur it is not at all uncommon, and sometimes it is quite abundant. However, it has peculiar habits—it does not fly during the day like *G. morsitans* and *G. palpalis*, it does not hover over the ground at definite times like *G. brevipalpis* and *G. pallidipes*, but always remains motionless on tree trunks and lianes. Occasionally specimens, usually one or two, are sometimes attracted by men and animals passing by. These may make their appearance at any time of the day, but prefer the cooler hours, e.g., early in the morning or more often late in the evening. But *G. fusca* also has a definite period of activity, namely from 7 to 8 p.m., or one to two hours after sunset, and if a haunt of the fly be passed during this time, numerous attacks are sure to be made.

"6. Females of *G. fusca*, unlike those of *G. brevipalpis* and *G. pallidipes*, are commonly found, and form nearly 50 per cent. of the specimens captured—whether the flies be taken on the wing or resting on trees, etc.

"7. Since forest belts usually occur near water, it is in the neighbourhood of the latter that *G. fusca* is generally found, but *G. fusca* also occurs in forest belts where there is no water in the immediate vicinity, and may even be found in forest a few kilometres distant from the nearest water. In this respect, therefore, *G. fusca* is unlike *G. palpalis*, but resembles *G. pallidipes*, *G. brevipalpis* and *G. morsitans*.

"8. The haunts of *G. brevipalpis*, *G. pallidipes* and *G. fusca* are situated almost exclusively along the roads and paths."

At the end of the paper data are given regarding the proportion of the sexes existing among different batches of tsetse flies around Katombe.

"1. Of 165 specimens of *G. fusca* captured at Katombe in February (a few of which were taken on the wing), 88 were males and 77 females.

"2. Of 255 specimens of *G. fusca* captured at Katombe in March, 143 were males and 112 females.

"3. Several species of tsetse flies captured one morning on tree trunks between Masembi and Musinga Lenge were divided as follows:—

(a) 27 *G. brevipalpis*, 21 males, 6 females.

(b) 4 *G. pallidipes*, 3 " 1 "

(c) 7 *G. fusca*, 4 " 3 "

"4. Of 344 *G. pallidipes* captured at Katombe from February to March, 281 were males and 63 females.

"5. Of 237 *G. pallidipes* captured on the Katombe-Kabalo route in February, 193 were males and 44 females.

"6. Of 509 *G. morsitans* captured on the same route during the same journey, 304 were males and 205 females.

"7. Of some 5,000 *G. brevipalpis* captured at Katombe and elsewhere, only 50 were females, and of these about 75 per cent. were captured on tree trunks."

W. Y.

HELMINTHIASIS.

LEIPER (R. T.). Report on the Results of the Bilharzia Mission in Egypt, 1915.—*Jl. Roy. Army Med. Corps.* 1918. Mar. Vol. 30. No. 3. pp. 235-260. With 1 plate & 1 fig.

This, the last instalment of Dr. Leiper's Report, includes Part V dealing with adults and ova, and Part VI giving the bearing of previous work on *B. japonica* and concluding remarks. [The earlier instalments were summarised in this *Bulletin*, Vol. 6, p. 437; Vol. 7, p. 345; and Vol. 8, p. 509.] Between 1851, when BILHARZ noticed that certain eggs passed in the faeces were distorted, the terminal spine being apparently displaced laterally, and 1903, when Sir Patrick MANSON suggested that there might be two species of Bilharzia, there appears to have been little interest in this anomaly, but following the later date there was lively controversy between LOOSS and SAMBON on the validity of *B. mansoni*, LOOSS maintaining that both forms were referable to one species. An account is given of the animal experiments carried out to settle this point, with the result that it was established that the cercaria derived from *Planorbis boissyi* gave rise to lateral spined eggs whilst those derived from *Bullinus* gave rise solely to terminal spined eggs, and hence that these two kinds of eggs are the normal and characteristic products of two distinct species, *B. haematobia* and *B. mansoni*, and are spread by different intermediary hosts. There is not, as LOOSS maintained, "a continuous series of intermediary stages between the two types" of eggs. It is noted that *Bullinus* is found in the larger canals, the smaller irrigation channels and the village ponds or "birkets," whereas *Planorbis boissyi* is found in the smaller irrigation channels only.

An explanation is offered of the puzzling fact that whereas urinary bilharziasis prevailed among the Marg children to the extent of 90 per cent. *P. boissyi* was relatively more infected than was *Bullinus*, and also of BILHARZ's observation of terminal and lateral spined eggs in the same female. Among South African tribes, not apparently in modern Egypt, though the existence of such a belief is attested by figures on some of the temple walls of ancient Egypt, it is believed that infection enters through the orifice of the penis during bathing and a sheath is worn as a preventive. Leiper suggests that this belief can be explained by the entry of small leeches causing profuse bleeding. Leiper attaches more importance to infection through mucous membrane than do some writers, and in this he follows DAY. On the extent of risk to troops he writes:—

"The risks were among those stationed in small parties on the various bridges, roads and canal crossings throughout the Delta and among the troops occupying new camps on the freshwater canal, in the Fayum and elsewhere. Although supplied with pure water for drinking purposes, this had often necessarily to be supplemented by local supplies for general purposes. At one such place it was pointed out to me that the daily ration of water could be supplemented with ease 'from a wee bit burn' which seemed to be of clear good water. A brief examination showed however that there were many *Bullinus* in this stream, which was simply an irrigation channel derived from a main canal on which was a large native population a mile or two inland. Bilharziasis [he adds] should now be treated as one of those diseases for which the individual is mainly, if not entirely, responsible."

He next considers the morphological differences between the two Egyptian species as far as ascertained hitherto, noting that a final settlement must be based upon a comparison of adult worms taken from human cases of unmixed infection. The differences were set forth in this *Bulletin*, Vol. 7, p. 347. As to nomenclature he says:—"It is to be hoped that on grounds of use and suitability the specific names of *Bilharzia haematobia* and *Bilharzia mansoni* may retain their present application," noting however that the original *Distomum haematobium* of BILHARZ was based on mixed material.

There is not space in which to summarise the last Part, which will be read by those interested in the history of the discoveries relating to *Bilharzia japonica*. It may be noted in passing that Leiper attributes the success of his present enquiries to the finding of a "morphological clue" in the absence of pharynx in the *Bilharzia* worm from the cercarial stage onwards, and this clue he was able to establish by examining FUJINAMI's "invasion forms" of *B. japonica* on his visit to Japan in 1914.

By this means he was able to exclude the bulk of Cercariae of unknown origin in Egypt and the necessarily limited employment of monkeys was rendered practicable. In this way the tentative conclusions based upon the morphology of the cercariae were experimentally confirmed and the specific nature of the various *Bilharzia* cercariae found was definitely settled.

A. G. B.

DA SILVA (Pirajá). *A Schistosomose na Bahia*.—32 pp. 1917. Bahia: Imprensa Official do Estado.

This short monograph summarises the recent advances towards a solution of the question of the specificity of *Schistosoma haematobium* and *Schistosoma mansoni*. The author was one of those who, as early as 1908, held the opinion that *S. mansoni* (or *S. "americanum"* as he frequently calls it) differed from *S. haematobium* both in morphology and in pathogeny. He relates the interesting fact, to which LUTZ has lately drawn attention, that the "*Cercaria Blanchardi*" described by him in 1912 from *Planorbis bahiensis* is actually the cercaria of *S. mansoni*. *Planorbis bahiensis* is recognised by LUTZ to be identical with *P. olivaceus* which was first experimentally shown by him to be the carrier of *S. mansoni* in South America in the *Brazil-Medico* of 2nd Dec. 1916. [It is probably also identical with *P. guadeloupensis* implicated later by ITURBE.]

R. T. Leiper.

MONROE (Frazer F.). *Report of a Case of Bilharzia*.—*Proc. Med. Assoc. Isthmian Canal Zone*. 1916. July-Dec. Vol. 9. Pt. 2. pp. 77-78.

A female patient admitted to hospital suffering from pleurisy was found to have also a mild infection of the urinary system with *Schistosoma haematobium*. Blood, an occasional pus cell and a goodly number of terminal spined ova were seen in the urine. Five days later the urine gave a negative result on microscopical examination and remained so for some weeks when an occasional egg and a few

blood, pus and epithelial cells were again passed. The patient was a white woman who had come direct to Panama from Egypt three and a half years previously. In the discussion on the paper Dr. W. T. BURRELL states that during trips to the interior of the Panama Isthmus he had been on the outlook for cases of bilharzia but had found none of the *haematobium* variety. Two cases of *Schistosoma mansoni* had come under his notice and both proved to have come from Saint Lucia. He does not believe that the disease existed on the Isthmus in any form a few years ago and in practice he had not come across any case of a similar nature during fourteen years.

Previous cases from the Panama Isthmus were reported by Dr. N. D. BRAYTON in 1909 and by Dr. W. G. BAETZ in 1912.

R. T. L.

CURJEL (Dagmar Florence). A Case of Bilharzia Infection (imported from Mesopotamia, and occurring in the Civil Population at Karachi).—*Indian Med. Gaz.* 1918. May. Vol. 53. No. 5. pp. 176–178.

Special precautions are being taken to prevent the importation of bilharziasis into India by troops from East Africa and Mesopotamia but no machinery exists for a similar control of returning civilians. That such may occur is illustrated by the case reported in this paper. A girl, age 11, was admitted to the Lady Dufferin Hospital, Karachi, complaining of persistent haematuria. This had apparently been contracted at Mohammerah, a town of Persia situated on the Hafar Canal which joins the Karun with the Shatt-el-Arab and flows into the latter forty miles above its mouth at Fao and about twenty miles below Basra. The mother states that at least half of the children in Mohammerah suffer from "red water." After treatment with methylene blue for over a month the haematuria gradually decreased. The ova are fewer in number and are deeply stained. The majority of the eggs are still capable of hatching out, giving active miracidia.

R. T. L.

CAWSTON (F. G.). "Bilharzia in Rivers." [Correspondence].—*Med. Jl. S. Africa.* 1917. Sept. Vol. 13. No. 2. p. 30.

At Magaliesberg, where cases of Bilharzia are known to have been contracted from bathing in the river, the author found in September specimens of *Limnaea natalensis* one of which was infected with "*C. catenata*." A single specimen of *Physopsis africana*, from the spot where the boys bathe, was heavily infected with Bilharzia cercariae. "The cercariae which were not full size were contained in a sporocyst producing daughter-sporocysts. Some of these daughter sporocysts showed a slight constriction towards one extremity and a short budding process which would shortly develop into a fresh sporocyst." The river runs through Hekpoort to join the Crocodile River and at this place also the author has seen a lad who had contracted disease from bathing there.

R. T. L.

CAWSTON (F. G.). The Cercarial Infection of Transvaal Snails.—*S. African Med. Rec.* 1918. Jan. 12. Vol 16. No. 1. pp. 6-8.

The more common fresh water snails of stagnant pools or slow running rivers in the Transvaal would appear to be *Limnaea natalensis*, *Physopsis africana*, *Isidora schakoi*, *Planorbis pfeifferi* and a species of *Ancylus*. Many are infested with various kinds of trematode worms. Of these cercariae the author remarks: "I have seen no pharynx in any I have examined but all of them possess a gut which divides into two just above the ventral sucker." In the Transvaal he has found "cercariae with divided tails and the other characters of the schistosoma group developing in rediae." The cercariae which the author has previously recorded under the name *C. secobii* (*secobiana*) is present in Transvaal rivers and infests *Isidora schakoi*, although certain differences led the author to regard his diagnosis as merely tentative. As seen in *Isidora compta* these cercariae (*C. secobii*) "were found to be developing in rediae which were elongated and possessed a terminal oral sucker and lateral locomotor appendages." "We know that Bilharzia cercariae infest at least two different species of snail, *P. africana* and *I. schakoi*." Two *Isidora* at Potchefstroom "contained sporocysts producing cercariae similar to those which produce Bilharzia infection in man but without a divided tail." Twelve specimens were found infected with *Cercaria* "*frondosa*." Of 269 specimens of *Physopsis africana* collected from tributaries of the Little Crocodile River, the Hex River at Rustenburg and the Spruit at Scheerpoort four specimens were infested with Bilharzia cercariae. *C. catenata* were present in *Limnaea natalensis* and *Planorbis pfeifferi* at Rustenburg.

R. T. L.

CAWSTON (F. G.). The Possible Intermediary Hosts of Schistosoma in South Africa.—*Jl. Trop. Med. & Hyg.* 1918. Apr. 1. Vol. 21. No. 7. pp. 69-70. With 11 figs.

In *Physopsis africana* in South Africa there would appear to be at least three different species of furcocercous cercariae. One, *Cercaria oculata*, found near Durban by the author; a second, apparently the true cercaria of *Bilharzia haematobium*, found by Dr. BECKER at Nijlstrom; and a third *Cercaria secobii*, common at Maritzburg, first found by the author [and apparently that described by him as the cercaria of Bilharzia in 1915]. At Durban brick fields *Isidora* [*Bullinus*] *tropica*; at Maritzburg *Isidora* [*Pyrgophysa*] *forkali* [*forkali*] and *Isidora* [*Bullinus*] *compta*, and at Potchefstroom *Isidora* [*Bullinus*] *schakoi*, *Limnaea natalensis*, *Unio caffer*, *Corbicula radiata* and *Pisidium* sp. have been collected by the author. Dr. PIROW, during a residence of over thirty-six years at Potchefstroom, has never yet come across a case of Bilharzia disease which could have been contracted locally and it is unlikely that *Cercaria* "*frondosa*," a leptocercous cercaria, found in 45 per cent. of the *Isidora* there, attacks human beings. [In the preceding paper the author states "*we now know that Bilharzia cercariae infest at least two different species*," viz., *P. africana* and *I. schakoi*. While this may well be, in view of their very close relationship to other species of *Bullinus*

already experimentally implicated, there is no evidence that the various forms so loosely and repeatedly termed "*Bilharzia cercariae*" in this author's numerous papers are actually such.]

R. T. L.

CAWSTON (F. G.). *Bilharziasis in South Africa.*—*Jl. Amer. Med. Assoc.* 1918. Feb. 16. Vol. 70. No. 7. pp. 439-441.

In South Africa bilharzial haematuria is especially prevalent among the school children of the low veldt and careful analysis of certain schools has shown that 80 per cent. of the boys and 10 per cent. of the girls are infected. In many of the young persons infected haematuria is the only symptom. "In some schools anaemia, general malaise and backwardness among the pupils who are bilharziatics are very noticeable." The author again summarises the investigations made in South Africa which led to the successful discovery by Dr. BECKER of the *Bilharzia cercaria* in *Physopsis africana*. Among the many drugs advocated in the treatment of *Bilharzia* disease hexamethylenamin is, in the author's opinion, perhaps the most effective especially in combination with buchu. Sodium salicylate is also of service especially when there is pain and renal colic. Rest and a light diet often result in improvement without drug treatment but the symptoms are only too likely to recur. Many cases show every indication of renal calculus where none exists. Operative treatment is best avoided in this disease.

R. T. L.

CORT (William Walter). *Homologies of the Excretory System of the Forked-Tailed Cercariae. A Preliminary Report.*—*Jl. Parasit.* 1917. Dec. Vol. 4. No. 2. pp. 49-57. With 2 text-figs.

An increased knowledge of the excretory systems of little known types of cercariae will be of great help in solving life-histories by suggesting the groups of adults to which such forms belong. In certain cases the close relationship of two cercariae may be shown by comparison of their excretory systems, when on account of differing degrees of development of adaptive larval characters they superficially appear to be very different. The author deprecates the tendency to relate all fork-tailed cercariae to the Schistosoma group. There is a definite group of fork-tailed cercariae with pharynx and the author's observations show that within this group, which the arrangements of the excretory system shows to be a natural one, there are represented two different families. The excretory system of the *Schistosoma japonicum* cercariae has six flame cells in the body and two in the anterior region of the tail. In *Cercaria douthitti* the arrangement is homologous except in the number of flame cells. Another eyespotted apharyngeal fork-tailed cercaria is named *C. elephantis* and the excretory system of this new species corresponds exactly with that of *C. douthitti*. These three cercariae form two groups of the *Schistosomatidae*. A third group of fork-tailed cercariae contains *Cercaria emarginatae* n. sp. and *Cercaria douglasi* n. sp. which possess a pharynx. This group includes *Cercaria vivax*, but is not to be included in the *Schistosomatidae* although the excretory system indicates a fairly close relationship.

R. T. L.

MOUCHET (R.). Bilharziose à localisation appendiculaire.—*Bull. Soc. Path. Exot.* 1918. Apr. Vol. 11. No. 4. pp. 297–300. With 2 figs.

Bilharzia infection of the stomach, lung and appendix has seldom been recorded. Its occurrence in the appendix would appear to be more common than hitherto believed as three cases were found by the author out of 180 autopsies. At Elizabethville, where the author was stationed, the disease was infrequent. Of 5,151 boys who passed through the camp of a neighbouring copper mine a considerable number of abnormal stools were examined but on six occasions only were Bilharzia eggs discovered. Two further cases of rectal bilharziasis were found post mortem. Urinary bilharziasis was seen once only. The patient came from Nyasaland and had also a rectal infection.

In the three cases of bilharzial appendix now recorded the eggs found are stated to have been terminal spined. They were seen clumped together forming miliary tubercles under the serous covering. In two of the cases there was evidence of chronic appendicitis although the patients had given no history of pain referable to the appendix. Histologically the lesions were found to consist (a) of an intense infiltration of the muscular tissue of the appendix with eggs and a slight and diffuse inflammation, (b) of small clumps of eggs surrounded by dense fibrous capsules under the serous and mucous surfaces. In some cases these nodules became infiltrated by leucocytes and thus gave rise to small miliary abscesses discharging into the lumen of the appendix.

R. T. L.

DESNOS (E.). Bilharziose vésicale traitée par les cautérisations diathermiques (haute fréquence).—*Bull. Acad. de Méd.* 1918. Jan. 8. 3 Ser. Vol. 79. Year 82. No. 1. pp. 37–40.

In view of the analogy, from the cystoscopic stand-point, between bilharzial tumours and papillomatous and epitheliomatous growths of the bladder wall, the author was led to try the effect, on cases of vesical bilharziasis, of high frequency. This procedure not only cauterises the lesions but appears to kill the eggs infiltrating the bladder wall. Details are given of the successful application of this method in a single case. After the tenth treatment the haematuria disappeared. As a result of a series of applications of high frequency over a period of six months there was a marked diminution in the tumour formation and ultimately the bladder wall presented only white cicatrices. The symptoms had disappeared. The case was a very favourable one as it was taken early and there were no complications.

R. T. L.

MAYER (Martin). Behandlung der Bilharziakrankheit mit Emetin.—*Münch. Med. Woch.* 1918. June 4. Vol. 65. No. 23. p. 612.

In August 1914 the author treated a case of urinary and intestinal bilharziasis with a course of emetine hydrochloride subcutaneously injected. The blood disappeared from the urine and stools and the patient showed great improvement. In view of the series of cases published more recently by DIAMANTIS [this *Bulletin*, Vol. 11, p. 81] a more extended trial is advised in uncomplicated cases.

R. T. L.

CHAJES (B.). Zur Kenntnis der Schistosomiasis (Bilharziosis).—*Deut. Med. Woch.* 1918. Jan. 17. Vol. 44. No. 3. pp. 65-66.

This is a short clinical description of a case contracted at the Cape, South Africa.

R. T. L.

ITURBE (Juan). Anatomía de la cercaria del *Schistosomum mansoni*.—*Gaceta Med. de Caracas.* 1917. May 31. Vol. 24. No. 10. p. 81. With 1 fig.

The cercariae, as found 50 to 60 days after the miracidium has penetrated the intermediate host, have reached their full development and measure 0.1 to 0.13 mm. in length, 0.04 mm. to 0.05 mm. in breadth, and have a bifid tail of which the trunk measures 0.14 to 0.15 mm. by 0.02 to 0.025 mm., while the prongs are 0.04 to 0.05 mm. in length.

R. T. L.

FUJINAMI (A.) & SUEYASU (Y.). Ueber die Hautinvasion des *Schistosomum japonicum* und Beitrag zur Kenntnis der natürlichen Immunität der Schistosomum-Krankheit. [Skin Invasion by the Cercariae of *Schistosomum japonicum*.] [Japanese text.]-*Kyoto Igaku Zasshi (Kyoto Jl. Med. Sci.)*. 1917. July. Vol. 14. No 5. pp. 126-141. With 8 figs. [Author's summary in German. pp. 57-59.]

[From Review by R. G. MILLS]

Pieces of skin of a rat and of a chicken were placed for 3 to 24 hours in water containing free swimming cercariae. Both were equally well invaded although the latter is a naturally immune animal. This indicates that gland secretion, warmth or blood circulation are not essential for the penetration of the skin. In non-susceptible animals including the duck and frog the cercaria while penetrating the skin do not reach the portal system. In the rat the hair follicles and gland ducts were the points of entrance but these are absent in the chicken and duck in which skin penetration likewise occurred. In the subcutaneous tissue under the skin the cercaria became surrounded by giant cells of the "foreign body" type. Eventually the internal structure of the cercaria became indistinct and gradually disappeared.

R. T. L.

LAWTON (F. B.). The Early Symptoms following Infection by *Schistosomum mansoni*.—*Mcd. Jl. Australia.* 1917. Sept. 22. Vol. 2. 4th Year. No. 12. pp. 247-250.

"Twenty-four Australians were admitted to No. 3 Australian General Hospital in Cairo suffering from some or all of the following symptoms: abdominal pain, enlarged and tender liver and spleen, pyrexia, bronchitis, urticaria and diarrhoea. None had travelled before enlistment in Australia. During the three months preceding the onset of the symptoms they had all encamped at Tel-el-Kebir and had apparently contracted infection with *B. mansoni* by bathing in a freshwater canal in which the water flows sluggishly near the

camp. "Itching of the skin was observed by several on coming out of the water." There was a marked eosinophilia (36 per cent. to 76 per cent.) and lateral spined eggs were after prolonged search found in the faeces. None of the patients had signs of vesical infection. Onset of the symptoms was generally gradual with loss of appetite, persistent headache, pains in the back and limbs, and dizziness. There was usually a cough and this sometimes was the first symptom. These symptoms were followed by abdominal pain. Shivers and sweats were frequent. Headache was usually very troublesome. With a raised temperature the pulse was slow. Urticaria was always present, usually in the second or third week and lasted from 12 to 48 hours. Large wheals were scattered over the body and limbs. Liver and spleen were enlarged and tender. The abdomen was often distended and there was marked tenderness over the descending colon and in the right upper quadrant. Often the stool was normal but diarrhoea was an outstanding feature in a few cases and did not last more than 24 hours. Detailed clinical reports are given of three of the cases.

R. T. L.

GIRARD. Sur l'existence à Madagascar de la dysenterie bilharzienne à *Schistosomum americanum* ou *Mansoni*.—*Bull. Soc. Path. Exot.* 1918. Jan. Vol. 11. No. 1. pp. 34-36.

Three cases of intestinal bilharziasis due to *Schistosomum* "americanum" have been detected among a number of cases of dysentery in troops under observation in the Hospital of Diégo Suarez. In one case the eggs were found in considerable numbers in the stool. The patient was extremely cachectic when admitted and later succumbed. In the other cases the infection was much milder, and eventually recovery took place. These are stated to be the first instances of the occurrence of Manson's bilharzial dysentery in Madagascar.

R. T. L.

KIYONO (Kenji) & MURAKAMI (Kiyoshi). Ueber das Schicksal der in die Pfortaderbahn geschickten Fremdkörper und die reaktive Wucherung des Lebergewebes in der Umgebung der eingeführten Fremdkörper, insbesondere über die Entstehung der Leberzirrhose bei der japanischen *Schistosomum*-Krankheit. [*Schistosomum japonicum*. A Study of the Reaction produced by the Introduction of Foreign Bodies into the Portal Circulation, with Especial Reference to the Lesions that develop about the Eggs of this Fluke.] [Japanese text.]—*Kyoto Igaku Zasshi* (*Kyoto Jl. Med. Sci.*). 1917. July & Sept. Vol. 14. Nos. 5 & 6. pp. 1-48. [Authors' summary in German pp. 69-70.]

[From Review by R. G. MILLS.]

The amount of reaction in the liver of dogs, resulting from the injection of various foreign bodies such as lycopodium spores, starch grains and oil drops, is small as compared with that resulting from the emboli caused by eggs of *S. japonicum* in experimental schistosomiasis. In proportion as the egg development had proceeded a

cell infiltration and granulation tissue formation occurred from the elaboration during this development of an intensely irritating toxic substance. The fibrous elements and unstriated muscle fibres of the vessel walls underwent extensive degeneration in the area saturated by this poisonous substance. The tissue change was definitely greater than could be explained as due to a purely mechanical irritation. With the death of the egg the poison production stopped and the area soon became overgrown with an extensive scar tissue formation and limiting capsule. Certain club-shaped structures seen in the immediate vicinity of the living eggs were considered to be "the products of the metabolism of the developing egg and had been excreted in a liquid condition or passed out through the lid." [There is no operculum in the Schistosomidae eggs.] The importance of this substance lies in the fact that it alters the tissue in which the eggs are embedded and thus assists in their extrusion from the host.

R. T. L.

DE VÉZEAUX DE LAVERGNE. Un deuxième cas de distomatose hépatique. —*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1918. Feb. 7. Vol. 34. 3 Ser. No. 3-4. pp. 97-98.

The diagnosis in this case is based upon the discovery of the eggs of *Fasciola hepatica* in the stools. The liver appeared to be normal both in size and function. The patient suffered from dysentery but neither bacillary nor amoebic organisms were detected in the stool. He had served in an infantry regiment in France since 1916 and in ordinary life was a farmer in Vire.

R. T. L.

BROWN (N. W.). The Fasciolopsinae of China: A Study of Two Species from Chekiang Province.—*Bull. Johns Hopkins Hosp.* 1917. Oct. Vol. 28. No. 320. pp. 322-329. With 4 plates.

From a batch of 188 specimens of *Fasciolopsis* collected at Shaohsing "it was evident that *F. buski* was susceptible to marked variations from a common type or that there were included in this assortment more than one species." The worms "measured from 17 to 48 mm. in length, in width from 7 to 17 mm. and in thickness from 1 to 4 mm. Some were tongue-shaped elongated thin and flexible; others were oval in shape firm and stocky." Dividing the worms into these two groups it was found that the long flexible flukes with irregular contours and conspicuous vitellaria possessed no spines while those more nearly elliptical, thicker and with prominent ventral suckers possessed cuticular spines. The former totalled 83, the latter 105. The eggs found in Group I had an average length of 0.128 mm. width 0.084 mm. and operculum 0.031 mm. In Group II the figures were 0.138 mm., 0.082 mm. and 0.023 mm.

With minor exceptions the specimens of Group I correspond to the accepted descriptions of *F. buski*. In mature worms however "the cirrus pouch is definitely convoluted, the shell gland is oval and located in the anterior portion of the middle third of the fluke." *F. fülleborni* is said to belong to this group and corresponds closely to the largest forms.

Group II corresponds closely to WARD's description of *F. rathouisi* except for the presence of spines. The author makes a new specific name *Fasciolopsis spinifera* for this group pending the discovery of spines in the type specimens of *F. rathouisi* and *F. goddardi*. The paper is illustrated by numerous microphotos and a large synoptic table of the characteristic features of the various worms previously described is given.

R. T. L.

MORIYASU (R.). [Notes on Paragonimus].—*Taiwan Igakukai Zasshi* (*Jl. Formosa Med. Soc.*). 1917. Feb. 28. No. 172. pp. 127-128.
[From Review by R. G. MILLS.]

The direct relation between the use of crabs as food and the incidence of Paragonimiasis is slight. A kind of shrimp or lobster is another secondary host in Korea and the obvious methods of prevention are the avoidance of this form of uncooked food, care in the drinking of water from rivers and streams and perhaps care of the sputum and faeces. The initial symptoms are cough, bloody sputum and sometimes haemoptysis. The blood contains an unusual number of eosinophiles. Experimentally the injection of an emulsion of lung distomes into the vein of an animal was found to give rise to an eosinophilia followed by a short negative phase and ultimately a return to the normal. In subcutaneous injection the negative phase lasted as long as eighteen days, then a quick rise and a return within a week to normal followed. Flukes experimentally introduced into the abdominal cavity produced the same result.

R. T. L.

ANDO (R.). [5th Report on the Study of the Development of *Paragonimus ringeri*.]—*Saikingaku Zasshi* (*Jl. Bacteriol.*). 1917. Mar. 15. No. 258. pp. 287-288.
[From Review by R. G. MILLS.]

The viable encysted larvae were able to develop when introduced into cats or dogs by the mouth or directly into the abdominal cavity. After infection the upper and middle portion of the ileum showed hyperaemia and occasionally haemorrhage. In cats the larvae had reached the abdominal cavity six hours after ingestion and the thoracic cavity in ninety six hours; evidence of pulmonary bleeding appeared in eight days. In dogs it took twenty-three days for the worms to reach the lungs and eggs appeared in the sputum and stools in about three months.

R. T. L.

YOKOGAWA (T.). [*Paragonimus ringeri*, Study of Stages from the Crab and Points of Difference distinguishing it from Similar Cysts occurring there.].—*Taiwan Igakukai Zasshi* (*Jl. Formosa Med. Soc.*). 1917. May 28. pp. 298-307.
[From Review by R. G. MILLS.]

There are at least two forms of cysts in the crab, the larger being the intermediate stage of the lung fluke. The smaller is sometimes found in crabs from districts not infected with the lung worm. This

small form can be reared partially at least in mice and inhabits the bile passages. The suckers are unusually distinct and the spine, found in the oral sucker of *Paragonimus*, is absent. [The adult stage is not diagnosed.]

R. T. L.

NAKAGAWA (K.). [Description of the Cysts and Young Developing Worms of *Paragonimus westermanii*.]—*Taiwan Igakukai Zasshi* (*Jl. Formosa Med Soc.*). 1917. June 28. No. 176. pp. 366-368.
[From Review by R. G. MILLS.]

In his previous articles the author had overlooked the fact pointed out by YOKOGAWA that there are two species of encysted cercariae in crabs. A new series of illustrations is given of the various stages of development. It is noted that a larval spine is present in the oral sucker of the cercaria of *Paragonimus* and is absent from the corresponding stage of the false“ encysted form.”

R. T. L.

KOBAYASHI (H.). [A Crayfish as One of the Intermediate Hosts of *Paragonimus westermanii*.]—*Chosen Igakukai Zasshi* (*Korea Med. Soc. Jl.*) 1917. Aug. 28. No. 19. pp. 65-69.
[From Review by R. G. MILLS.]

The cercariae of *Paragonimus westermanii* have been recognised in two different species of crayfish. The percentage of infection differs greatly in different localities. The number of cysts in a single crustacean may be as high as one thousand and this apparently depends upon the age, and thus the length of exposure, but not upon the sex of the host. It was independent of season.

R. T. L.

KOBAYASHI (H.). [Details of Structure in the Encapsulated and Adult Stages of *Paragonimus westermanii*.]—*Chosen Igakukai Zasshi*. (*Korea Med. Soc. Jl.*). 1917. Aug. 28. No. 19. pp. 66-70
[From Review by R. G. MILLS.]

Issue is taken with WARD and HIRSH in regard to their differentiation of *P. ringeri*, *P. westermannii* and *P. kellicotti* as separate species. There is sufficient variation in the limits of the original species [*P. westermannii*] to nullify these new specific delimitations.

R. T. L.

KOBAYASHI (H.). [Cercariae in River Snails of Korea.]—*Chosen Igakukai Zasshi* (*Korea Med. Soc. Jl.*). 1917. Aug. 28. No. 19. pp. 57-60.
[From Review by R. G. MILLS.]

In Korea twelve species of river snails have been found, including *Melania libertina*. Of these seven occur also in Japan. A general description is given of the cercaria of *Paragonimus westermannii*. A fuller report is promised later.

R. T. L.

ANDO (R.). [Effect of Emetine Hydrochloride Injection in Pulmonary Paragonimiasis.]—*Nisshin Chiryō (Modern Therapeutics)*. 1917. May 10. No. 1. pp. 1-15.

[From Review by R. G. MILLS.]

The effect of injecting emetine repeatedly in infected dogs was not very encouraging because of the toxic symptoms induced even in the same relative doses as used for man. Improvement was noticed in those cases in which there was excessive expectoration and a tendency to marked haemoptysis. The vitality of the worms was apparently lessened although they were not dislodged.

R. T. L.

HASUI (N.). [Effects of Various Aniline Dyes upon *Clonorchis sinensis*.]—*Chugai Iji (Home & Foreign Med. News)*. 1917. May 20. No. 8912. p. 657.

[From Review by R. G. MILLS.]

As the living flukes were noticeably susceptible to methyl violet, crystal violet and Nile blue sulphate it was thought that an injection of these might prove a useful method of killing the parasites in infected animals. Although an aqueous solution of methyl violet was scarcely absorbed from the intestine when injected into a vein it stained the liver intensely and was excreted in the bile. Doses of this dye toxic for dogs sufficed to kill only part of the parasites while Nile blue sulphate proved even more toxic in its action.

R. T. L.

MUTO (Masatomo). i. Ueber den ersten Zwischenwirt des *Metagonimus yokogawai*. [The First Intermediate Host of *Metagonimus yokogawai*.] [Japanese text.]—*Kyoto Igaku Zasshi (Kyoto Jl. Med. Sci.)* 1917. Jan. Vol. 14. No. 1. pp. 115-134. [Author's summary in German pp. 7-8.]

— ii. Biologische Studien über die Cercarien und die encystierten Cercarien des *Metagonimus yokogawai*. [Biological Study of the Cercaria of *Metagonimus yokogawai*.] [Japanese text.]—*Ibid.* July. No. 5. pp. 79-100. [Author's summary in German. pp. 54-56.]

[From Reviews by R. G. MILLS.]

The cercaria of *M. yokogawai* when freed from the snail can live in water for about eight hours. It survives in gastric juice for one minute only. It has proved impossible to produce infection by administering these forms to susceptible animals by the mouth or by introducing them directly into the duodenum. Nor does infection take place through the skin.

The cercariae after leaving the snail can invade the body of a gold fish through the skin but not, apparently, through the mouth. The invading parasite continues its development in the new host and attains infectivity only after about 20 days. Attempts to infect an animal always proved unsuccessful with encysted cercariae less than 21 days old, while success followed the administration of cysts

containing cercariae 21 days to 3 months old. The absolute necessity of a second intermediate host is thus proved. The release of mature encysted cercariae from the body of the fish must be a very unusual occurrence. The danger of infection does not arise from drinking water but from the eating of infected raw fish.

R. T. L.

MUTO (S.). [Intermediate Host of *Metagonimus yokogawai*.]—*Saikingaku Zasshi* (Jl. Bacteriol.). 1917. Mar. 15. No. 258. p. 288.
[From Review by R. G. MILLS.]

Cercariae of *Metagonimus yokogawai* taken from the liver of *Melania libertina* were fed to gold fish and carp. These fish were then given to cats and twelve to thirteen days later eggs of the adult parasite were found in the faeces.

R. T. L.

HILARIO (J. S.) & WHARTON (L. D.). *Echinostoma ilocanum* (Garrison) : A Report of Five Cases and a Contribution to the Anatomy of the Fluke.—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1917. July. Vol. 12. No. 4. pp. 203-211. With 1 plate & 1 text-fig.

Five new cases of infection with *Echinostoma* (*Fascioletta*) *ilocanum* have been studied by the authors. There was anaemia with occasional headache and dizziness [but these symptoms can scarcely be attributed to the few parasites present]. All the cases were natives of Zambales, Luzon and belonged to the towns San Felipe, San Antonio, San Narciso and Cabagñan. It is believed that this is a common intestinal fluke in Zambales. Eight specimens examined gave a range of 4.03 mm. to 7.82 mm. in length and in maximum breadth 0.98 mm. to 1.6 mm. Fresh specimens were a transparent grey and the testes, ovary and uterine coils could be seen distinctly through the walls. The spines upon the body varied remarkably. "They are very unstable and the least handling causes them to be lost." The characteristic collar of spines round the anterior end was seen in 3 out of 16 specimens and only in one could they be definitely studied and even there some of the spines had been obviously lost. The ova gave the following measurements: maximum length 111 microns, breadth 74.4μ ; minimum length 88.8μ , breadth 53.6μ ; average length 101.21μ , breadth 56.4μ .

R. T. L.

CHATTON (Edouard). i. Observations et expériences faites à Gabès sur le ver de Guinée. Preuve expérimentale de l'infestation des *Cyclops* par voie intestinale.—*Arch. Inst. Pasteur de Tunis*. 1918. Mar. Vol. 10. No. 3. pp. 158-169. With 1 fig.
— ii. Observations sur le Ver de Guinée. Preuve expérimentale de l'infestation des *Cyclops* par voie digestive.—*Bull. Soc. Path. Exot.* 1918. Apr. Vol. 11. No. 4. pp. 338-348.

Dracontiasis is not endemic in North Africa although close relations have always obtained with West Africa where the disease is widespread. It was noticed that none of the cases of guinea-worm had

left the endemic region more than a year before the worm erupted. It is therefore probable that the parasite takes from eleven to twelve months to attain maturity. This long incubation period renders it impossible to exclude infected persons at the time of their enlistment. Under these circumstances the author set out to enquire whether there was a danger that the oases in Southern Tunis might become endemic centres owing to the importation of infection by black troops from French West Africa just as in earlier times the disease was carried to certain regions of Brazil and British Guiana and took hold there. Happily the risk is small for the infected soldier has few chances of contaminating the waters of the oasis and seeks relief in the hospital. If however contamination did occur the water conditions are favourable to the vitality of the embryos which can tolerate the high temperature of the thermal springs. There is too an abundance of Cyclops. The four species collected in the oasis of Gabes were *C. viridis*, *C. macrurus*, *C. prasinus* and an unidentified species. Of these species *C. macrurus* proved refractory to experimental infection. The other three species were readily invaded by the guinea-worm larvae. In every instance the invasion took place by the intestinal tract and no evidence was obtained in support of the view held by FEDSCHENKO or later writers that these larvae can penetrate the skin of the cyclops. The larvae are ingested passively; many are injured. A certain number are able to penetrate the intestinal wall, owing to the absence of a peritrophic membrane, and thus reach the body cavity. In none of the Cyclops found in the Oasis of Gabes did the larvae undergo any metamorphosis even after 40 to 50 days. This provides an explanation for the remarkable absence of endemic cases there. It points also to the probability that only certain species of Cyclops are efficient hosts for the guinea-worm.

R. T. L.

MARTINEZ ALVAREZ (A.). *Algunas notas sobre la filariasis*. (Trabajo leído ante los miembros de la Academia de Medicina de Puerto Rico, 1918.) [Notes on Filariasis.]—36 pp. 1918. With 3 plates & 3 charts. Lin. y Tip. Boletín Mercantil.

The chief points of this paper are (1) that in Porto Rico, there seems to be a seasonal fluctuation of cases of acute filariasis, the greatest number occurring in April and May and again in July to October, (2) that in fever, due to filariasis or to combined malaria and filariasis, the pulse rate always keeps low (charts 4 and 5). Filariasis extends all round the coasts of Porto Rico, and was probably originally imported through slave traffic with Africa.

J. B. Nias.

CADET. *Trois observations de Filariose chez une européenne et chez deux indigènes*.—*Bull. Soc. Méd.-Chirurg. Indochine*. 1916. Dec. Vol. 7. No. 10. pp. 396-400. With 4 plates.

In the course of an examination of the blood in a young Frenchwoman in Southern Annam the author met with a single filaria embryo, which he figures, measuring 250μ in length and not exceeding 2 to 3μ in breadth. There are two distinct "breaks" in the nuclear core

with red spots here and there especially at the extremities, after staining with Leishman's stain. These characters and an absence of periodicity are held to distinguish this microfilaria from that of *Filaria bancrofti*. The two indigenous cases from Hué are of slight interest. The first showed a slight swelling in the scrotum of three or four months' duration. There is a brief history of haematochyluria, irregular fever and nocturnal headache. The embryos are typically those of *F. bancrofti* but very scanty. In the second case there is a history of haematuria lasting about ten days. This commenced without apparent cause and there were practically no general symptoms. In a drop of blood taken at 5 a.m. three filaria embryos were seen.

R. T. L.

WATERFIELD (Noel E.). Two Cases of Filariasis.—*Brit. Med. J.* 1918. Jan. 12. p. 54.

The author gives short clinical notes of two cases of filariasis (lymphocoele) as of interest as the first recorded from the Hedjaz or Red Sea littoral of Arabia. On inquiry similar cases are found to be very common there. In Jeddah hundreds of people are reported to have enlarged testicles and swelling of the scrotum. As Suakin on the Sudan Red Sea littoral where the conditions are practically identical with Jeddah the disease is unknown.

R. T. L.

SHIBUTANI (T.). [Filaria removed from the Epididymis. Case Report.]
Gunidan Zasshi (Jl. Milit. Surg. Japan). 1917. Apr. 20. No. 68. pp. 81-85.

[From Review by R. G. MILLS.]

A swelling of the scrotum and left inguinal region, in a young man of twenty-six, was opened and 15 cc. of dull yellowish brown fluid was removed. In this a few actively moving sheathed embryos $275\mu \times 7-8\mu$ were found. Others occurred in the tunica vaginalis. From a mass of newly-formed tissue an adult worm 4.1 cm. in length was removed and was diagnosed as *Filaria bancrofti*. The tissues when examined microscopically contained a great number of eosinophiles and much newly formed connective tissue. The dilatations of the lymph vessels of the part were visible to the naked eye. Embryos had been previously found in the blood of the patient at night only, save on one occasion when he was asleep during the day. There was no chyluria.

R. T. L.

FLU (P. C.). Onderzoek naar de verbreiding van de larven van de *Filaria bancrofti* onder verschillende bevolkingsgroepen van Nederlandsch-Indië. [Prevalence of Larvae of *Filaria bancrofti* in Different Localities in the Dutch East Indies.]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1918. Vol. 58. No. 1. pp. 209-215.

The blood of 842 prisoners confined in the prison at Glodok was examined by the author for the presence of *Filaria* parasites. The results are given in a table showing the localities from which the prisoners came. The paper is of purely local interest.

J. B. N.

ELLIOT (R. H.). Removal of Worm (*Filaria loa*) from the Eye.—*Brit. Med. Jl.* 1918. May 4 & 25. pp. 502-504; 604. With 3 figs.

This paper contains highly interesting details of a case of loasis contracted apparently in Benin during a residence there of eleven months in 1909-1910. Calabar swellings first appeared ten months after the patient's arrival there and have continued at irregular intervals up to the present time. At first they appeared in the hands and feet but latterly have been limited to the hands. These swellings are described as very painful, the over-lying skin feeling very tight. The worms appeared at times in the neighbourhood of the eye and ear. "In the former situation they caused great irritation, which becomes intense when they find their way under the conjunctiva. The combination of itching, pain and irritation caused by their movements he describes as simply maddening." On four previous occasions, viz. once in 1911, twice in 1914 and once in 1917 worms were removed from the eyes. The operation recorded later in the present paper makes the fifth experience.

A new and highly important addition is made to our knowledge of the symptoms induced by *loa*. The patient suffered on several occasions from earache, consisting of an intense neuralgia behind, below and in front of the ear and accompanied by great hyperaesthesia of the skin around. These attacks are so definite that the patient is able to diagnose their cause with certainty. The pain passes away within a few hours with characteristic suddenness.

The author's procedure in securing the worm was both novel and successful. As the worm could not be detected in the conjunctiva and there seemed little hope of it appearing hot fomentations were applied in the expectation that the worm would again come to the surface under the influence of heat. This procedure was based upon the fact that these worms cause eye trouble when the patients sit before a warm fire and proved immediately successful. Cocaine was instilled and the conjunctiva over the worm was seized in conjunctival forceps. This was then tied tightly with a silk suture passed through the fold of conjunctiva and the forceps were removed. The worm was thus tightly held. A small incision was then made with scissors. Through this one end of the worm suddenly protruded. This was seized and the whole worm gently withdrawn. The worm measured 36.5 mm. in length and proved to be a full grown male [as stated in the second note (May 25)].

R. T. L.

TOMKINS (Harding H.). Removal of *Filaria loa* from the Eye. [Correspondence].—*Brit. Med. Jl.* 1918. June 1. pp. 632-633.

Five years ago a patient came to the writer in London to have a filaria removed from his eye. The parasite was identified as a female *loa* by Dr. HARFORD. According to the author the patient "had had one before some years back having got this one in the Argentine." [Private correspondence with the author shows that the patient had also visited West Africa.]

R. T. L.

LEIPER (R. T.). *Thelaziasis in Man: A Summary of Recent Reports on "Circumocular Filariasis" in Chinese Literature, with a Note on the Zoological Position of the Parasite.*—*Brit. Jl. Ophthal.* 1917. Sept. Vol. 1. No. 9. pp. 546-549.

The main facts given in the papers by STUCKEY, HOUGHTON and TRIMBLE on "circumocular filariasis" [see this *Bulletin*, Vol. 10, p. 121] are related. The worms were determined as *Filaria palpebralis* Wilson. Leiper points out that they differ from that genus in several important respects as regards both their morphology and development. They have been placed by RAILLIET in the genus *Thelazia* which comprises those forms in the family *Thelaziidae* found parasitic in the eyes of mammals. RAILLIET recognises six species and there seems good ground for assuming, though there are slight points of difference in the description, that this one corresponds with *Thelazia pallipaeda* Railliet and Henry 1910, usually found in *Canis familiaris*. This is a common eye worm in the dog in Asia.

A. G. B.

DA MATTA (Alfr.). *Considérations sur l'entéro-trichocephalose et la trichocephalose appendiculaire.*—*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 932-941. With 2 plates.

During a period of 12 years in which the author has been in practice in Manaos he has seen 883 children under twelve years of age of whom 635 had intestinal parasites. The species occurred in the following percentages: *Necator americanus* 605=95.2 per cent.; *Trichocephalus trichiuris* 523=82.3 per cent.; *Ascaris lumbricoides* 332=52.2 per cent.; *Oxyuris vermicularis* 192=30.2 per cent. and *Strongyloides intestinalis* 152=23.9 per cent. In 62 cases the whipworm occurred alone. The chief object of the paper is to illustrate the potentiality for harm of this parasite by two striking cases of which a detailed account is given. From the first case, which proved fatal, 295 whipworms were collected from the caecum. The patient, only 4 years of age, was very pale and oedematous. The red cells numbered 580,000, the eosinophiles 14.3 per cent. The haemoglobin index was 15 per cent. The stools showed numerous whipworm eggs and abundant mucus. Hyperalgesia of the skin was specially marked over the region of the caecum and colon. The second case was that of a child 8 years of age which likewise succumbed. At post mortem eleven whipworms were found in the lumen of the appendix attached to the wall, while 109 were collected from the caecum.

R. T. L.

STRONG (S. B.). *Trichocephalus dispar.*—*Southern Med. Jl.* 1918. May. Vol. 11. No. 5. pp. 345-347.

So far as the writer of this paper has observed "the symptoms and signs of trichocephaliasis are practically identical with those of ankylostomiasis, the only difference being that of severity." The histories of five cases are detailed in support of the view that the trichocephalus "can give rise to very annoying and even severe symptoms such as severe anaemia, dirt eating etc." Eosinophilia

is of constant occurrence and lymphadenopathy is fairly frequent just as in ankylostomiasis and ascariasis. As no efficient vermifuge is known "the attention of other workers is respectfully drawn to this fact."

R. T. L.

JUARROS (César). *Un caso de tricocefalosis.* [A Case of Trichocephalosis.]—*Gaceta Med. de Caracas*. 1918. Feb. 15. Vol. 25. No. 3. pp. 28-29. [Reprint from a Spanish journal *El Laboratorio*.]

Notes of the case of a man, aged 65, who was seized with an epileptiform attack, followed by fever and headache. The fits recurred at the rate of one or two per month, and later on were accompanied by lumbar pain and haematuria. In the intervals there was intense diarrhoea. Eventually an examination of the stools was made and revealed the presence of ova of *Trichuris*. Treatment with thymol was thereupon instituted, and the patient recovered.

J. B. N.

MONTÓYA T. (W.). *Papel Patógeno del Tricocéfalo.* [The Pathological Action of *Trichocephalus*.]—*Rev. Clin. Medellín*. 1918. Mar. Vol. 2. No. 8. pp. 353-392.

The author considers that *Trichocephalus* is responsible for the majority of chronic dysenteriform diarrhoeas in town-children in the tropics [Colombia], and recommends very strongly fig-tree juice as the only vermifuge capable of dislodging it. Fifteen cases occurring in children are quoted in illustration. From 10 to 20 grammes of the juice should be given in a single dose, followed in 2 hours time by a dose of castor oil. According to the author the treatment brings away hundreds of worms, and cuts the symptoms short at once.

J. B. N.

BAERMANN (G.). *Eine einfache Methode zur Auffindung von Ankylostomum—(Nematoden)—Larven in Erdproben.*—*Meded. Geneesk. Lab. te Weltevreden*. Feestbundel uitgegeven ter gelegenheid van de opening van het nieuwe geneeskundig laboratorium te Salemba, Weltevreden. pp. 41-47. 1917. Batavia: Javasche Boekhandel & Drukkerij.

The results of a series of thirteen experiments show that *Ankylostome* larvae in earth can be quickly and easily detected. These larvae wander rapidly from earth into open water. In loose earth they so migrate at the rate of about 1 cm. per minute. In water they settle at about 1 cm. per second. Within twenty four hours after immersion the larvae leave loose humid earth and the bulk do so within the first half hour. The results are so constant that of eight larvae experimentally sprinkled in earth seven were afterwards recovered by this means. Ten to fifteen times more larvae wander downwards than upwards. With compact earth, which opposes considerable difficulty to these migrations, only occasional larvae are seen even after six hours.

R. T. L.

MINAGAWA (K.). [Hookworm Development in the Old-Style Japanese Latrine.]—*Iji Shimbun*. (*Medical News*). 1917. Sept. 25. No. 982. pp. 1235-1246.

[From Review by R. G. MILLS.]

For agricultural purposes in Japan the urine and faeces are as far as convenient collected separately. In faeces so kept hatching of ankylostome eggs is ordinarily good but when urine is added in any considerable amount the specific gravity of the resulting fluid is raised and it becomes progressively more difficult for the eggs and larvae to proceed with their development. Strong concentrations of extracted faeces are very inhibitory and this is apparently due to physical conditions such as osmotic pressure rather than to toxic substances. In public latrines the urine and faeces are passed together and remain mixed for a considerable time. Whenever the specific gravity is over 1015 fresh urine as a diluent is inhibitory for the young ankylostome larvae, but decomposed urine must be of 1025 sp. gravity to produce the same effect. Recently hatched larvae are much more susceptible to external influences than older forms. In any portion of faeces raised above the surface on paper or scum the eggs hatch in two hours when the temperature is high.

R. T. L.

PARK (W. H.). Note on the Propagation of Hookworm Disease in China.—*China Med. Jl.* 1917. Nov. Vol. 31. No. 6. pp. 483-484.

Contrary to general belief the Chinese are well acquainted with hookworm disease and with the fact that the infection enters through the feet. It is colloquially known as "Mulberry Leaf Yellow." It is stated by a Chinese from near Kiangyin on the Yangtse River that "Mulberry Leaf Yellow" is on the increase there and that about 50 per cent. of the mulberry leaf gatherers contract the disease. The conditions for hookworm propagation in the mulberry groves of China are as ideal as those of the coffee plantations of Porto Rico.

R. T. L.

QUERENS (Percy Lennard). A Note on the Fate of the Ova of *Ankylostoma* Ingested by the Larvae of *Musca domestica*.—*New Orleans Med. & Surg. Jl.* 1918. Feb. Vol. 70. No. 8. pp. 653-655.

Infected faeces were put into open containers and allowed to become contaminated with the ova of *Musca domestica*. Fresh stools were also infected with half grown fly larvae. These were dissected at intervals and some were allowed to pupate. Of one hundred fly larvae examined only one showed an ankylostome ovum in its alimentary canal. The contents were hyaline instead of being composed of numerous distinct cells. Fifty adult flies were examined just after emerging and in none was any ankylostome ovum or larva found. The author concludes from his experiments that the possibility of transmission of hookworm by the common housefly is very slight for the ova or larvae appear to be digested. He recognises that the mere mechanical transmission by adult flies is an accepted fact.

R. T. L.

TRABUE (Eugene McD.), KIELTY (Robert A.) & HAVERCAMPF (C. W.). *Ankylostoma duodenale*, A Symposium. i. Hookworm in the Army (Trabue). ii. A Survey for *Uncinaria americana* (Kielty & Havercampf).—*Milit. Surgeon*. 1918. Mar. Vol. 42. No. 3. pp. 287-297.

i. The author reports as follows on the examination, for hookworm, of 3,773 men composing a regiment of infantry and a machine gun battalion of the U.S.A. Army:—

	Inf.	M.G. Batt.
Strength of command.. ..	3,417	531
Examined, positive	624	35
Examined, negative	2,672	442
Total examined	3,296	477
Absent from command	69	37
Total accounted for	3,365	514
Unaccounted for	52	17
Total	3,417	531

The author was especially struck by the wide variability of the symptoms in a given number of cases. A number of obscure cases gave "a history of long periods of so-called dyspepsia and its apparent relief and inevitable relapses but attended throughout with steady although slowly progressing indisposition, lethargy, loss of energy, weight and ambition."

ii. A survey was made of all men from the Southern States [U.S.A.] in the various commands at an undisclosed station. In 6,159 examinations of faeces *Uncinaria* eggs were found in 24.4 per cent. Oil of chenopodium was used in approximately five thousand doses without untoward manifestations. The authors conclude that "the outcome of their survey should result in a more efficient fighting force, a diminished susceptibility to contagious disease among the men and an increase in resistance should infection be contracted."

R. T. L.

LANE (Clayton). A Preliminary Note on an Improved Technique for the Detection of Hookworm Eggs.—*Indian Med. Gaz.* 1918. May. Vol. 53. No. 5. pp. 173-174.

A new procedure, called the Leviation method, is recommended. "A measured half cc. of stool is mixed with a sufficiency of water to fill a centrifuge tube of the size which will be presently used in the centrifuge. It is then thoroughly broken up by persistent shaking in a corked tube." "It is then strained through wire gauze with 100 meshes to the linear inch. The fluid is then centrifuged . . . to bring down all hookworm ova." The upper cork is then removed and the fluid poured off leaving the deposit on the lower cork. This is then transferred to a glass slide, marked with grease pencil to show the limits of range of the mechanical stage. "With about one cc. of water the deposit is removed from the cork and tube and is spread out evenly"

over this area and thoroughly mixed. After allowing it to stand for five minutes the slide is immersed in water and manipulated until all yellow matter has floated free. By this method nearly the whole of the obscuring fine matter can be removed and very few ova need be washed away. It has been found possible to collect and count, upon an area of 2 inches by 1 inch, 2,227 hookworm ova from half a cc. of stool, which the author reckons is a 750 per cent. increase on results obtained by the centrifuge. The method gives a great increase in the rapidity and accuracy of the microscopist's examination.

R. T. L.

HOWARD (H. H.). **Pre-Natal Hookworm Infection.**—*Southern Med. Jl.* 1917. Oct. Vol. 10. No. 10. pp. 793-795.

The earliest age at which hookworm infection has been observed is three months. In Ceylon in 1916 the author saw cases in which the "apparent clinical manifestations were out of proportion to the degree of infection and the length of time these children could have had the disease had they acquired it in the usual way and post-natally."

From the experimental data available it may be safely assumed that an infant if infected at the time of birth could not show ova in the stool sooner than the end of the fourth week after its birth. Consequently ova found in faeces of an infant at any time prior to the end of the fourth week must result from a prenatal infection. An instance is recorded in this paper of the discovery of ova in the stool of an infant fourteen days old. The mother presented the usual clinical symptoms of hookworm disease and had ova in the stools also. There was a history of ground itch during pregnancy. [A case of prenatal infection with *Bilharzia* was recorded in Egypt in 1905.]

R. T. L.

McMULLIN (J. J. A.). **A Case of Uncinariasis with Severe Anemia.**—*U.S. Nav. Med. Bull.* 1917. July. Vol. 11. No. 3. pp. 380-383.

A Filipino, age 22, employed in the navy dockyard, applied for treatment on account of headache, dizziness, weakness and constipation which had first become noticeable six weeks previously. Although very troublesome these symptoms had not prevented the patient from continuing his work. The clinical condition of the patient is thus recorded:—

"Extremely anemic, temperature 101.4° F., pulse 130, resp. 28, marked pulsation of jugulars, loud bruit over cervical vessels, loud systolic murmur over precordium, loudest at base, systolic thrill on palpation, heart not enlarged, lungs negative, spleen and liver not enlarged." On microscopical examination the blood index was found to average:—"White blood corpuscles 6,200; red blood cells 1,200,000; haemoglobin 35 per cent.; coagulation time 12 mins., color index 1.5, sp. Gr. 1.052. The differential count was Poly. 55, sm. lymph. 10; Lg. mono. 3; Tr. 2; Eosinoph 5. The blood was pale and watery, microcytes, macrocytes, normoblasts, megaloblasts, poikilocytes, and stippling were present."

The blood picture resembled that of pernicious anaemia. The faeces contained ova of *Necator americanus* and *Ascaris*. Temporary

improvement followed blood transfusion with compatible blood. The patient died shortly after of pneumonia which developed on the side towards which a well-meaning hospital apprentice had directed the full blast of an electric fan for about two hours. The author comments at length on the care necessary in the performance of agglutination and haemolysis tests prior to blood transfusion and the difficulty experienced in this case of finding a compatible donor; ten volunteers having had to be rejected on this account.

R. T. L.

DARLING (Samuel T.), BARBER (M. A.) & HACKER (H. P.). **The Treatment of Hookworm Infection.**—*Jl. Amer. Med. Assoc.* 1918. Feb. 23. Vol. 70. No. 8. pp. 499-507.

The data presented in this paper are abstracted from the authors' report to the Rockefeller Foundation on the subject of the effect of hookworm infection on the working efficiency of the people of Malaya, Java and Fiji. The relative efficacy of the various anthelmintics is fully discussed and it is held that oil of chenopodium is the most efficient when given in medium doses. *Necator americanus* is less resistant than *Ancylostoma duodenale* to a given dose of vermicide. The resistance of both species increases with the size of the worm. As regards dosage it was found that a single dose of 2 cc. of oil of chenopodium removed 95·8 per cent. of the worms present, as compared with 98·9 per cent. obtained from the administration of 3 cc. divided into three doses. This raises the question whether the subdivision and repetition of the dosage is really worth while. When the maximum dose of thymol (viz., 30 grains 3 times) was given 97·8 per cent. of the worms were removed so that the efficiency of the maximum dose in these two drugs is about equal. When the dose is reduced thymol loses its efficiency with greater rapidity than chenopodium. This greater range of satisfactory dosage is a definite factor in favour of oil of chenopodium and makes it preferable to thymol for children. Where the species present is the more resistant *Ancylostoma* chenopodium is better than thymol. For the administration of oil of chenopodium manufactured soft capsules are markedly inferior to freshly filled gelatin capsules.

As regards after-effects dizziness was frequently noted after thymol but was even more common after chenopodium. Muscular incoordination and inability to rise was noted after thymol but was more frequent after chenopodium. On the other hand "burning in the stomach" and headache were more marked after thymol. Vomiting occurred in 18·7 per cent. of 123 cases after thymol and in 11·4 per cent. of 79 cases after chenopodium. Deafness occurred only after 3 cc. of oil of chenopodium and usually only after the second treatment. It was seen in five cases out of 446 treatments i.e., in 1·3 per cent. In most cases the deafness was slight and transient. Death supervened upon a state of deep and prolonged coma in two cases. This occurred after the second full dose of chenopodium given within four days of the first. After these mishaps the period between treatments was lengthened and no other serious or fatal incident occurred in many hundreds of treatments given to persons of all ages and conditions.

Chenopodium is relatively just as efficacious in removing *Ascaris*, *Clonorchis* and *Taenia*. Even *Oxyuris* and *Trichuris* yielded to this

The authors recommend half the maximum dose (i.e., 0.5 cc. three times or 1.5 cc.) of oil of *chenopodium* as a routine vermicide.

R. T. L.

WRIGHT (James M.). **Note on Treatment of Hookworm Disease.**—*China Med. Jl.* 1917. Nov. Vol. 31. No. 6. pp. 484–485.

In the Takling district, South China, between 40 per cent. and 50 per cent. of the people are infected with hookworm. The author emphasises the fact that in cases of pregnancy hookworm disease and its treatment are serious. A preliminary saline cathartic is very necessary to any of the various forms of treatment. In advanced cases even though the worms are expelled a fatal ending may ensue as the fatty degeneration and anaemia consequent on the infection may be beyond repair. [The paper contributes nothing new to our knowledge of the treatment of hookworm disease.]

R. T. L.

NOGUCHI (R.). [Thymol Poisoning Haemoglobinuria following Hookworm Treatment.]—*Taiwan Igakukai Zasshi (Jl. Formosa Med. Soc.)*. 1917. Feb. 28. No. 172. pp. 96–110.

[From Review by R. G. MILLS.]

A young adult was given three doses, each of three grammes of thymol and one of beta-naphthol at intervals of thirty minutes. Preceding and following this castor oil was given in full doses. That night severe pain along the urethra was complained of and an intense haemoglobinuria was recorded. On the ninth day the patient died with urinary symptoms of acute nephritis and icterus. During the last week the blood was examined daily. The haemoglobin index showed a fall from 20 per cent. to 18 per cent., the red blood corpuscles sank from 2,060,000 to 1,565,625 while the white blood corpuscles rose from 24,000 to 55,000. The eosinophile count gave from 2.5 per cent. to 2 per cent. Erythroblasts were quite numerous.

R. T. L.

RANSOM (B. H.) & FOSTER (W. D.). **Life-History of *Ascaris lumbricoides* and Related Forms. (Preliminary Note.)**—*Jl. Agric. Res.* 1917. Nov. 19. Vol. 11. No. 8. pp. 395–398.

A repetition of STEWART'S experiments in feeding rats and mice with *Ascaris* eggs gave results agreeing very closely with those he has recorded. The experiments to infect pigs by feeding with *Ascaris* eggs were negative. This is attributed to the fact that the animals used were several months old. The authors believe that development is direct and that no intermediate host is required but that age is a highly important factor in determining susceptibility to infection. This is of course in harmony with the well known fact that it is particularly in children and young pigs that infestations are common.

R. T. L.

STEWART (F. H.). On the Life-History of *Ascaris lumbricoides* L.—*Parasitology*. 1918. Jan. Vol. 10. No. 2. pp. 197–205.

Details are given, in this memoir, of experiments which show that when ripe eggs of *Ascaris suilla* hatch in the intestine of the pig, the larvae thereafter pursue the same course through the body as has been previously established by the author to occur in experimentally infected rats and mice. The larvae are found in the lung of infected pigs on the 6th to 8th day and in the trachea on the 8th day. Dead larvae were seen in the pig's faeces on the 11th day after infection. It may be assumed that *Ascaris lumbricoides* undergoes the same migration in man. A new series of six experiments was made to bring about the development of adult *Ascaris* in pigs. In five cases the results were negative although from the very large number of larvae administered it is practically certain that hepatic-pulmonary invasion followed. This evidence fails to support the hypothesis of direct development without an intermediate host and further experiments are required. "It is to be doubted whether under natural conditions man would ever receive a sufficiently large dose of eggs to cause serious pulmonary symptoms in a healthy person." "There is reason to suppose that a great deal of the debility of the natives of the tropics is due to Ascariasis and that this disease is at least equal to ankylostomiasis in economic importance."

R. T. L.

STEWART (F. H.). On the Development of *Ascaris lumbricoides* and *A. mystax* in the Mouse.—*Parasitology*. 1918. Jan. Vol. 10. No. 2. pp. 189–196. With 1 plate.

In mice experimentally fed with developed eggs of *Ascaris lumbricoides* the author had previously found larvae abundant in the lungs and trachea on the 8th day. New experiments have enabled him to follow these larvae for a week longer. On the 9th day they begin to travel down the alimentary canal and on the following day appear in the faeces. They may be found in considerable numbers in the colon and caecum. The passage from the lungs to the caecum continues up to the 15th day and on the 16th day larvae occur in the faeces. The larvae measure from 1.3–2 mm. on the 10th day and 1.75–2.37 on the 15th day. Their morphology is described in detail and the chief features are well illustrated. Experiments made on mice with ripe eggs of *Ascaris mystax* and *Ascaris marginata* show that the larvae are set free and migrate from the stomach to the liver.

R. T. L.

WHARTON (Lawrence D.). Development of the Round Worm. [Correspondence.].—*Indian Med. Gaz.* 1918. Feb. Vol. 53. No. 2. p. 74.

The author contributes a useful summary of EPSTEIN's experiments on the infection of children by the administration of *Ascaris lumbricoides* eggs. In 1891 three children known to be free of infection were given on January 28th eggs containing living embryos. The faeces of two of these who remained under control in hospital were systematically examined and failed to show ascaris eggs up to April 12th. On April 24th the examination showed great numbers of eggs in both children.

The administration of santonin caused the expulsion of 22 *Ascaris* in one case and 72 in the other. During his own experiments on the development of *Ascaris lumbricoides* eggs the author became infected although during previous residence of nearly eleven years in an *Ascaris* infected country he had remained uncontaminated.

R. T. L.

BAUJEAN. Observation d'ascaridose hépatique.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1916. May. Vol. 7. No. 5. pp. 144-145.

A patient admitted to the hospital of Phnom-Penh died within a few hours of acute peritonitis. At post mortem the liver was found to be interspersed with numerous small abscesses varying in diameter from some millimetres to three centimetres. Some were deeply situated, others lay under Glisson's capsule. One of the latter, about the size of a nut and quite superficial, had burst into the abdominal cavity near the gall-bladder and had given rise to the peritonitis which had caused the death of the patient. These multiple abscesses resulted from the presence of *Ascaris lumbricoides* in the liver. Fifteen specimens in all were collected from the liver tissue and from the biliary ducts, which were greatly dilated. There were also a few worms in the intestine.

R. T. L.

DALE (W. Chalmers). Cyst in Abdominal Wall containing *Ascarides*.—*China Med. Jl.* 1918. Mar. Vol. 32. No. 2. pp. 131-133.

The passage of round worms through the abdominal wall is uncommon. In children the worms usually escape from the umbilicus while in adults the inguinal region is the most common site of exit. In the majority of recorded cases in which passage through the umbilicus took place the patient had first gastro-enteric symptoms followed by localised tenderness. In a few cases the presence of a patent omphalomesenteric duct was strongly suggested by the previous history. The case recorded in this paper is that of a girl age 7, who was noticed by her parents to have some fever and loss of appetite and to have pain in her abdomen. After santonin she passed thirty worms. Shortly after this a swelling appeared at the umbilicus which gradually increased in size and became more painful. Eventually the skin at the umbilicus gave way and worms passed almost daily through the fistulous opening. The case was operated upon successfully. The author is of opinion that the original opening in the intestinal wall through which the worms escaped must have been closed very early by inflammatory reaction and thus the worms were sealed up in a cyst in the abdominal wall.

R. T. L.

PRASAD (K.). A Case of Intestinal Obstruction due to *Ascaris lumbricoides* Perforation—Death. [Correspondence].—*Indian Med. Gaz.* 1917. July. Vol. 52. No. 7. p. 262.

A hale and hearty young man, age 33, was admitted as a prisoner to the jail at Myaungmya and as a matter of routine his stools were examined. No ova were detected. Three weeks later he came to

hospital complaining of pain in the stomach and said his bowels had not moved for two days. An enema gave no relief. On the following morning he vomited two worms and looked very ill with symptoms of peritonitis. After a dose of santonin and calomel two more worms were vomited. The patient expired in a state of collapse thirty-six hours after admission to hospital. At post mortem two recent perforations were found in the lower part of the ileum. There was a lump, about the size of a large lemon, in the right iliac fossa just above the caecum. This proved to be due to "eleven round worms of large size huddled together forming a sort of ball and blocking the ileo-caecal opening."

R. T. L.

KIDD (Alan). *Ascaridiasis simulating Appendicitis.*—*Lancet*. 1918 May 4. p. 637.

A Creole girl, age 8, was admitted to the Victoria Hospital, St. Lucia, with a diagnosis of appendix abscess. There had been abdominal pain with some vomiting for two or three days previously. On admission the temperature was 100° F. and the pulse 112. In the right iliac region a slight swelling could be seen. The abdominal wall was here rigid, tender on palpation and dull on percussion. Laparotomy was performed and it was then seen that the small intestine was densely packed with roundworms while the lower eight inches of ileum was so tightly packed that the wall was stretched and transparent. The appendix was normal and was not removed. The operation wound was closed and two days later santonin was given repeatedly. During the succeeding month 212 worms were passed and the patient was then discharged quite well.

R. T. L.

MONTEL (M. L. R.). *Erythème noueux et Ascaridiose Intestinale.*—*Bull. Soc. Méd.-Chirurg. Indochine*. 1916. Feb. Vol. 7. No. 2. pp. 48-50.

To the hitherto unique example of contusiform dermatitis, resulting from intense ascaridiasis, described by the author in 1906, a second case is now added. The patient was ten years old and for ten days had had simply slight fever with very obvious skin lesions. The whole body appeared to be covered with contusions, in the centre of which were subcutaneous nodules varying in size, numbering in all twenty-four. They occurred not only on the arms and legs but also on the back and scalp.

Santonin was immediately given along with castor oil. During the succeeding week fifty-five round worms were passed. The lesions immediately ceased to appear. There was an eosinophilia of 18 per cent.

R. T. L.

WOOD (W. Atkinson). *Appendicopathia oxyurica.*—*Med. Jl. Australia*. 1918. Mar. 23. Vol. 1. 5th Year. No. 12. pp. 234-235.

In thirty normal appendices obtained post mortem and in fifty appendices removed by operation no thread worms were seen

macroscopically. If threadworms cause symptoms of appendicitis apart from inflammation, the cases should have some characters in common. The author details seven cases of Appendicopathia oxyurica which occurred in his last 57 cases of operation for appendicitis. The histories were long and intermittent, vomiting was often absent, the temperature was usually normal or only slightly raised and the leucocytosis slight. Although there was tenderness the reflex nervous symptoms seemed out of all proportion to the severity of the local lesion. In nearly all there was a swelling of the lymphoid tissue and in two only was the colon bacillus present in abnormal profusion. This swelling alone is able to block the lumen and predispose to, if not actually excite, acute inflammation. Threadworms produce a type of catarrhal appendicitis not itself dangerous to life, but as a predisposing cause of more serious inflammation it ought to be treated by removal of the appendix.

R. T. L.

ORUI (K.). [Nematode Larva of Unknown Identity described from Faeces.]—*Iji Shimbun (Med. News)*. 1917. May 10. No. 973. pp. 584-589. With 4 figs. & 2 photographs.

[From Review by R. G. MILLS.]

An egg, found in the faeces, is described and figured as having a double-walled shell, much thinner than *Trichocephalus*, and as of elliptical shape, smooth surface and without projections. There are clear thick caps on both ends. The eggs measured $0.34-0.41 \times 0.07-0.085$. The caps were watch-glass shaped and measured $.0035$ mm. in thickness and $0.018-0.022$ mm. in length. As found in the faeces some of the eggs were unsegmented, others were hatched and all stages between were present. When just hatched the larvae measured 0.485 mm. $\times 0.0075$ mm. and were therefore larger than those of *Trichocephalus*, hookworm, *Oxyuris* or *Strongyloides*. There was a short thick mouth, a tubular oesophagus, and the rest of the body was filled with globular material. The anterior end was somewhat narrowed and the posterior very blunt. The patient had been subject for some years to urticaria.

R. T. L.

FRANCAVIGLIA (Condorelli). *Rhabditis pellio* (Sehn.) nell' urina di un nefritico.—*Boll. Accad. Gioenia di Sci. Nat. in Catania*. Nov. 1916—Mar. 1917. Ser. 2. No. 40-41. pp. 12-18. With 1 fig.

In the alkaline urine of a patient suffering from interstitial nephritis a microscopical nematode, showing rapid movements, was seen. The length varied from 190 to 300μ . The anterior end was rounded, the posterior tapered to a fine point. The cuticle was smooth. The mouth was unarmed, the oesophagus had a double bulb. Genital organs were absent. The worm was recognised as belonging to the Anguillulidae and is classified as *Rhabditis pellio*. The author is of opinion that the worm was only accidentally present in the urine and that it cannot be regarded, in the light of present knowledge, as a parasite of man.

R. T. L.

MCGAFFIN (C. G.). **A Case of Bothriocephalus Infection.**—*Med. Record.* 1917. Aug. 25. Vol. 92. No. 8. (Whole No. 2442.) pp. 327-329.

The presence of the bothriocephalus worm, in this case, was masked by physical symptoms which apparently had no relation to it. A diagnosis was only made a few days prior to death. A detailed account of the post mortem findings is given. Two days before death the blood count showed only 651,000 red cells. The white cells were diminished in number. [The eosinophiles are not stated.] The patient was born in Finland and had entered the United States eight years ago. The author feels confident that the tape-worm infection was contracted before her arrival in the United States and that a considerable number of similar cases will be found on close inquiry.

R. T. L.

O'FARRELL (T. T.). **Note on a Case of Infection with *Bothriocephalus latus*.**—*Lancet.* 1918. Apr. 20. p. 570.

The patient was a young woman who had never been out of Ireland and lived in the county of Leitrim near the river Shannon. From the same [unnamed] town the author had previously seen a similar infection. The symptoms somewhat simulated gastric ulcer. There was practically no anaemia and no eosinophilia. [COBBOLD states that it has been called the "Irish tapeworm." His notes make mention of a specimen, sent from Dr. PETTIGREW, which was "expelled from a young Irish girl."]

R. T. L.

CHRISTOPHERSON (J. B.) & IZZEDIN (Mustafa). **Acute Intestinal Obstruction by Tapeworms (*T. saginata*): Mechanical Blocking of Ileo-Caecal Valve, Necessitating Laparotomy.**—*Brit. Med. Jl.* 1918. June 22. pp. 697-698.

Acute obstruction due to intestinal worms is very rare and most of the cases on record are due to *Ascaris lumbricoides*. In the present instance a tapeworm, *Taenia saginata*, necessitated laparotomy. The case was characterised by the following chief points: "Absence of pain even at outset, or afterwards, although obstruction was acute. There was discomfort certainly due to over distension. There was very little, if any, collapse. The pulse was fairly good. There was fairly frequent vomiting." The authors consider that "absence of acute pain and very little collapse together with acute obstruction symptoms may be taken as a characteristic of obstruction due to intestinal parasites." In this cases there was no question of delaying the operation as "such a course was contraindicated by the vomiting, distension and peristalsis and total suppression of flatus and faeces."

R. T. L.

SOPARKAR (M. B.). **"A Trematode Parasite of Anopheline Mosquitos."**—*Indian Jl. Med. Res.* 1918. Jan. Vol. 5. No. 3. pp. 512-515.

Encysted cercariae closely resembling those recorded from Anopheline Mosquitoes by SINTON in 1917 have been found by the

author in the fins of certain freshwater fish as well as in *Planorbis exustus*. The larval development apparently takes place in this *Planorbis*. Of 7,194 specimens collected near Bombay 20 per cent. were found to be infected. *Anopheles rossi* and *Culex fatigans* were experimentally infected therefrom. The adult belongs apparently to the genus *Clinostomum* and is a parasite of some aquatic bird which feeds upon fish bearing the encysted cercariae. [*Anopheles claviger* in Italy and Holland is said to be infested to the extent often of 50 per cent.]

R. T. L.

NAMBIAR (T. V. Anandan). **Some Observations on the Prevalence of Helminth Infection among the Prisoners admitted in the Central Jail, Myingyan.**—*Indian Med. Gaz.* 1917. Dec. Vol. 52. No. 12. pp. 436-439.

That the practical importance of the early detection and treatment of parasitic infections of the bowels, particularly of ankylostomes, lies in the reduction of bowel complaints, anaemia and debility and possibly of other disorders is shown by some remarkable statistics. During 1915 there were, in a prison population of 1,156, 88 cases of dysentery and 36 cases of diarrhoea. In 1916, apparently as a result of routine anthelmintic measures the number of cases fell to 7 of dysentery and 7 of diarrhoea in a population of 1,175. The author considers that "prisoners losing weight without any accountable cause and those that pass loose stools frequently, should be suspected of being subjects of infection" and their stools examined for the presence of ova. Thymol proved not only useful against ankylostome worms but decidedly superior to oil of male fern in the treatment of tapeworm. The species of helminths recorded in the paper are *Ancylostoma*, *Taenia solium*, *Taenia saginata*, *Ascaris lumbricoides*, *Oxyuris vermicularis*, *Trichocephalus dispar*, *Hymenolepis nana*, *Bothriocephalus latus* and *Strongyloides*.

R. T. L.

TORRES (Octavio). **Contribution to the Study of Intestinal Helminthiasis in Bahia.**—*New Orleans Med. & Surg. Jl.* 1918. Jan. Vol. 70. No. 7. pp. 611-624. **Contribuição ao estudo das verminoses intestinaes na Bahia.**—*Brazil Médico.* 1917. Nov. 10 & 17. Vol. 31. Nos. 45 & 46. pp. 383-387; 393-396.

The verminoses produced by intestinal worms are very common in Bahia; 96 per cent. of apparently healthy individuals harbour intestinal helminths while in the inhabitants of the interior the infected form 100 per cent. In 1,213 cases ankylostomes were found 795 times, ascarids 700, trichocephalus 714, *Schistosoma mansoni* 209, oxyuris 86, anguillula 107; 57 were negative. Out of 25 cadavers autopsied the *Schistosoma mansoni* was found present in 18; sometimes 20 or 25 worms were collected. It may possibly be the cause of many cases of cirrhosis of the liver.

R. T. L.

KWUN (C.) & KOBAYASHI (H.). [Intestinal Parasites among the Koreans. Preliminary Report.]—*Chosen Igakukai Zasshi* (Korea Med. Soc. Jl.). 1917. Aug. 28. No. 19. pp. 72-78.

[From Review by R. G. MILLS.]

On the basis of the examination of 326 Koreans the following percentages of helminth infections are recorded.

	Per cent.		Per cent.
Trichuris	92.8	Paragonimus ..	5.3
Trichostrongylus ..	39.1	Metagonimus ..	[2 cases]
Ascaris	69.6	<i>Clonorchis sinensis</i>	3.7
Hookworm	39	Unknown eggs ..	3.1
Oxyuris	[1 case]	Tapeworm	9.5

Both *Ancylostoma duodenale* and *Necator americanus* are reported. The former is stated to be the more common in Korea although in Japan it is the latter that is the more prevalent.

R. T. L.

DE VÉZEAUX DE LAVERGNE. *Recherches sur le parasitisme intestinal des troupes en campagne.*—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1918. Feb. 7. 3 Ser. Vol. 34. No. 3-4. pp. 95-96.

Of a hundred French soldiers living in the trenches 73 were carriers of *Trichocephalus*, 7 had both *Trichocephalus* and *Ascaris* and 8 others had *Ascaris* alone, making a total of 88 per cent. infested with helminths. These results compare with those recorded in miners. In troops residing behind the line in cantonments there were no cases of *Ascaris* but 63 per cent. had *Trichocephalus*. The number of eggs seen in a preparation ranged from 1 in two slides to 5 in one slide; this according to BRUMPT's calculation gives 5 to 50 adult *Trichocephalus* in the large intestine of a number of soldiers. In none of these cases was an eosinophilia present but in *ascaris* infection it did occur. No *Ankylostome* eggs were met with.

R. T. L.

HALL (Maurice C.). *A Discussion of some Principles of Anthelmintic Medication.*—*New Orleans Med. & Surg. Jl.* 1918. Feb. Vol. 70. No. 8. pp. 637-653.

In a highly suggestive general article the author treats as matters for discussion rather than dogmatism a number of general principles.

(1) Anthelmintics are selective in their action; at least their dependable effectiveness is limited to certain sorts of worms, and follows from differences in structure, physiology and habit of the worms. Anthelmintic activity is not proportional to the antiseptic or to insecticidal properties of a drug.

(2) Certain kinds of worms require not only a suitable anthelmintic but also suitable modes of medication as variously exemplified by *Ascaris*, *ankylostome* and whipworm.

(3) Fluid extracts or other preparations using alcohol as solvent are frequently unsuitable as they are rapidly absorbed, largely in the

stomach and duodenum, occasioning irritation at the point of absorption and systemic effects of a more or less toxic character. The rapid and considerable absorption moreover leaves a comparatively small amount of the drug for actual anthelmintic action locally.

(4) The "insoluble" anthelmintics are not as insoluble as is generally supposed. Of thymol half to two-thirds is apparently destroyed or temporarily fixed in the body. It seems probable that oils increase the rate of absorption of certain anthelmintics such as thymol and oleoresin of male fern rather than the actual amount. The purgative effect of castor oil and its tendency to pass promptly through the alimentary canal apparently explain the satisfactory results obtained from its combination with chenopodium as contrasted with those where olive oil is used. Experiments on dogs showed that oleoresin of male fern is more dangerous when administered without a purgative than with a purgative even when the purgative is castor oil.

(5) At least some anthelmintics do not require "time to act" before the administration of purgatives.

(6) Preliminary fasting is important.

(7) Gastric stasis may occasionally interfere with the efficacy of anthelmintics, especially where purgation follows treatment at a long interval and where such depressant or constipating drugs such as oil of chenopodium are used.

(8) The passage of worms after anthelmintic treatment is an indication for continuing rather than stopping treatment. Cessation of treatment should be based rather on the disappearance of symptoms and the negative results of later microscopical examinations of the faeces.

(9) Severe helminthiasis calls for caution in the administration of anthelmintics. With a feeble emaciated patient the additional local irritation and toxic systemic effects of anthelmintic treatment may have to be avoided.

(10) While the majority of worms passed after anthelmintic treatment come away in the first 24 hours there is a fairly large per cent. discharged from one to six or seven days later due to the weakening or sickening of the worms after the poison or in other cases the delay is due to intestinal stasis.

R. T. L.

HALL (Maurice C.) & FOSTER (Winthrop D.). **Efficacy of Some Anthelmintics.**—*Jl. Agric. Res.* 1918. Feb. 18. Vol. 12. No. 7. pp. 397-447. With 1 fig.

The efficacy of the various anthelmintics in common use has been made the subject of detailed and exact study. The faeces of the animals treated were collected and the worms recorded for several days after treatment was administered. The animals were then killed and the remaining worms enumerated. In this way it proved possible to express the efficacy of a drug in the form of a mathematical ratio although various other factors such as the individual reaction of the animal, the amount of material in the alimentary tract, and the potency of the drug are scarcely under control and may seriously affect the accuracy of the conclusions unless a large series of tests are made. [Although the paper is a highly important one, the details

of the experiments are not reproduced here as they have to do chiefly with the anthelmintic effect of drugs on the parasites of dogs, sheep and poultry. The reader will find an admirable summary in the *Tropical Veterinary Bulletin*, Vol. 6, pp. 103-106.] The authors arrive at certain general conclusions that may be especially noted here:—Simple purgatives, calomel and castor oil may have some slight value as anthelmintics but it is hardly sufficient to justify their use for this purpose. Oil of chenopodium is the most reliable vermifuge for ascarids in dogs and swine but not if given mixed with the daily ration. For tapeworm, male fern proved efficacious when tested in dogs. Its combination with castor oil will avoid its toxic effects by causing its rapid and thorough elimination but further experiments are deemed advisable.

R. T. L.

SALANT (William). *The Pharmacology of the Oil of Chenopodium with Suggestions for the Prevention and Treatment of Poisoning.*—*Jl. Amer. Med. Assoc.* 1917. Dec. 15. Vol. 69. No. 24. pp. 2016-2018.

Oil of chenopodium is a strong local irritant, causing severe inflammation of the mucous membranes in experimental animals. Rabbits and cats are very susceptible. Dogs are more resistant but severe poisoning may occur in these animals. A dose that is not effective at first may cause serious symptoms and death when repeated within one or several days. This sensitiveness persists for from five to nine days. Resistance in animals is noticeably greater if these have been receiving a rich carbohydrate diet several days before the oil is given or if the administration is preceded by a sufficient quantity of fatty oil such as castor oil, olive oil or cocoanut oil. On the other hand while lowering the general toxicity of chenopodium oil this procedure gives rise to increased renal irritation, except in carnivorous animals. As the liver undoubtedly plays an important part in "detoxifying" the oil of chenopodium it may be expected to prove more toxic in hepatic and gastro-intestinal diseases. As regards treatment, when large doses have been swallowed lavage is recommended as absorption is slow. No chemical antidote has been found. Treatment of cases of poisoning must therefore be symptomatic. In experiments on the isolated heart digitalis and epinephrin proved excellent antagonists. The former is very persistent in its action and may completely overcome the depression caused by the oil. A diet containing a liberal amount of fats and carbohydrates for several days before treatment is a useful precaution and the prophylactic value of the routine administration of large doses of castor oil before and after the chenopodium oil should be given serious consideration.

R. T. L.

HIRST (J. W.) & MILLS (Ralph G.). *A Case of Fatal Poisoning by Oil of Chenopodium.*—*China Med. Jl.* 1917. Nov. Vol. 31. No. 6. pp. 485-489.

A woman, age 23, was delivered by Caesarian section in the wards of the Severance Union Hospital, Seoul; mother and child made a favourable recovery. As the mother was found to have a

(C484)

large number of eggs of *Ascaris lumbricoides* and *Trichuris trichiura*, and some eggs of *Taenia saginata* and *Ancylostoma duodenale* in the faeces she was given, on the ninth day, three doses of 5 minims of oil of chenopodium. Each dose was administered in 15 cc. of normal saline, an hour apart, followed in two hours by 20 cc. of castor oil. No food was given that morning. Two days later, as she still had some diarrhoea and symptoms of bowel irritation, zinc sulpho-carbolate was given. All symptoms had disappeared next day. Ten days after the first course oil of chenopodium was again given followed by 30 cc. instead of 20 cc. of castor oil. Even with this free catharsis was not secured. Convulsions set in and continued until death. Croton oil in glycerine resulted in the passage of two stools on the last day. There are full reports of the autopsy and of the histological findings. As the condition most resembled post partum eclampsia a differential table is given. The possibility of delayed chloroform poisoning and of eclampsia could not be completely excluded.

R. T. L.

VAN HOOFF (L.). *Essais de traitement au moyen de l'émétine d'affections autres que la dysenterie amibienne.*—*Bull. Soc. Path. Exot.* 1918. May. Vol. 11. No. 5. pp. 401-405.

The intravenous injection of an aqueous solution of emetine hydrochloride has given good results in several cases of helminthic infection. The author finds the drug of value in haemorrhoids and records its successful use in a case of rectal bilharziasis in which thirty to forty bloody stools were passed daily and there were ulcerated piles. Twelve injections of emetine brought about a distinct amelioration of the condition and a disappearance of the blood from the stools. A similar result followed in a case of ankylostomiasis in which blood and mucus was found in abundance in the stools. The ova in this case were still present in abundance after the improvement in the stool. Emetine injections likewise proved efficient in cases of tapeworm infection. In two instances *Taenia saginata* were expelled without any other treatment. In seven other cases of *Taenia* or *Bothriocephalus* a purge was given prior to and at the time of the injection. The parasite was expelled completely. Two further cases are related in which *Bothriocephalus* worms were successfully removed by these injections. The tapeworms were frequently very active when passed. With other species of helminths the results were negative.

R. T. L.

DAVENPORT (Cecil J.). *Quisqualis indica*, a Substitute for Santonin.—*China Med. Jl.* 1918. Mar. Vol. 32. No. 2. p. 133.

At the Shantung Road Hospital, Shanghai, a drug prepared from the seeds of *Quisqualis indica*, a plant grown in China, has been in use for over a year as a satisfactory substitute for santonin. The drug is fully described in STUART'S "Chinese Materia Medica" where it is stated to be a safe and efficient vermifuge. The plant belongs to the *Combretaceae* and it is a native of the tropical parts of America,

Africa and Asia. It is used as an anthelmintic in Burma, Malay Archipelago and in India where it is called the Rangoon creeper. The kernels are baked, until they give out an aromatic odour and then pulverised. Up to two drams of the powder may be given to a strong adult. *Ol. ricini*, *Pulv. rhei co.* or *Magnesium sulphate* is administered with it. The drug is not so successful against ankylostomes and other parasites as against *Ascaris*. The only untoward effects noticed have been hiccough, gastric irritation, etc.

R. T. L.

RATTRAY (M. J.). The Haemoglobin Index and Other Factors in Newly Recruited Coolies to the F.M.S.—*Indian Med. Gaz.* 1918. May. Vol. 53. No. 5. pp. 168–170.

This series of observations was made on Indian and Chinese coolies newly arrived at a Rubber Estate in Johore from their native coasts. In none was the haemoglobin index over 90 per cent. or under 30 per cent. In both races it was most usually between 60 per cent. and 70 per cent. Only 6 out of 331 individuals were free from helminth infection. The author is of opinion that "it would be wise to reject at the port of emigration all those showing a haemoglobin index under 60 per cent. and to view with suspicion all coolies so affected as to present pigmentation of the papillae of the sides and tip of the tongue as this is found to be associated in 90 per cent. of the cases with ankylostomiasis."

R. T. L.

KALA AZAR.

PRICE (G. Dodds). **Notes on an Anomalous Type of Kala-Azar.**—*Indian Med. Gaz.* 1917. Dec. Vol. 52. No. 12. pp. 427-429.

Attention is drawn to the existence of an anomalous type of kala azar, occurring in coolie lines where the usual type is prevalent, characterised by only slight enlargement of the liver and spleen, but in a large proportion of which leishmania can be demonstrated in the peripheral blood. Major MACKIE, I.M.S., found parasites in the peripheral blood of 15 out of 23 such cases collected by the author—a percentage three times as great as he has found before in Assam, even in advanced selected cases. The mortality corresponds with that found in the classical type of the disease. Eight months duration did not in the majority of the patients produce any further splenic enlargement. In two fatal cases the spleen weighed 10 and 13 ounces.

E. J. Wyler.

LABBÉ (Marcel), TARGHETTA & AMEUILLE. **Le kala-azar infantile en France.**—*Bull. Acad. de Méd.* 1918. Apr. 2. 3 Ser. Vol. 79. Year 82. No. 13. pp. 288-290.

Two cases of infantile leishmaniasis are recorded occurring in Nice, in Serbian refugees. The diagnosis was confirmed on microscopic examination by M. LAVERAN.

The infection is presumed to have been acquired in Nice as the first symptoms appeared 18 months after arrival. Two months before these developed a dog, which was thenceforward in close contact with the patients, was introduced into the household. The animal was later killed and though no leishmania could be found, the appearance of the bone-marrow and of the spleen was suggestive of recovery from canine leishmaniasis.

E. J. W.

MAYER (Martin) & REINHARD (Paul). **Zwei Fälle von Kala-azar (Leishmaniose) bei Deutschen (aus Nordafrika bzw. Kleinasien).** [Two Cases of K. A. in Germans, from North Africa and Asia Minor.]—*Deut. Med. Woch.* 1918. Feb. 7. Vol. 44. No. 6. pp. 150-152. With 2 charts.

The description of two cases the interest of which lies in the locality where the infection was acquired. One was an exchanged prisoner who had been taken from France to Algeria and there contracted the disease. The other became infected in Asia Minor. Leishmania were found on spleen or liver puncture in both.

E. J. W.

BRAHMACHARI (U. N.). **On the Presence of an Easily Precipitable Anti-Complementary Globulin-Like Substance in Human Serum and its Importance in the Diagnosis of Kala-Azar.**—*Indian Med. Gaz.* 1917. Dec. Vol. 52. No. 12. pp. 429-431.

In a former paper [this *Bulletin*, Vol. 11, p. 152] the author pointed out that when excess of distilled water is added to a kala azar patient's

serum, a precipitate is formed, and that this phenomenon can also be elicited in some other diseases. He now reports that if, instead of using an excess, only 2 or 3 volumes of distilled water are added to the serum, a precipitate appears almost exclusively in kala azar. This was found to occur in a series of 20 cases. Control experiments with the sera of twelve various diseases were negative. "In a few cases with enlarged spleen in which no L. D. bodies were found on spleen puncture, a similar precipitate was obtained though clinically they looked like kala azar." The test is considered to be of diagnostic importance. It can also be performed by taking some serum in a test tube, diluting 10-20 times with normal saline and gently running on to the surface some distilled water. In positive cases a distinct white ring is formed at the junction of the liquids. On account of its chemical reactions the precipitate is assumed to be a globulin-like substance. The author states that he has however failed to detect the presence in it of sulphur or phosphorus. The solution in normal saline of the globulin-like precipitate deviates complement in a haemolytic system, but it has no anticomplementary action while in solution in the serum.

E. J. W.

OLSEN (O.). *Serologische Untersuchungen bei zwei Fällen von Kala-Azar.* [Serological Investigations in Two Cases of K. A.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1918. Mar. Vol. 22. No. 6. pp. 81-89.

The serum in two cases of kala azar was investigated with the object of ascertaining the presence of specific agglutinins, lysins, and precipitins. The results were negative, as also were attempts to obtain a cutaneous reaction on the same lines as the tuberculin skin reaction. Experiments in complement fixation were also negative. Culture forms of leishmania were immobilized by normal human serum as well as by the patients' serum. Heating for half an hour at 55° C. destroyed the immobilizing power of the serum, and this was not restored by the addition of complement. There was no immobilizing effect with the serum of moribund tubercular patients, or with cerebro-spinal fluid. It was however present when pathological exudates and transudates were used. It was absent in the serum of the mouse, rabbit, cat, dog and sheep. There was slight inhibition with guinea-pig's serum.

E. J. W.

ROGERS (Leonard). *Sodium Antimonyl Tartrate vel Tartar Emetic in Kala Azar.*—*Indian Med. Gaz.* 1918. May. Vol. 53. No. 5. pp. 161-164. With 2 charts.

The author records the fact that he has now completely given up using tartar emetic for intravenous injections, in favour of sodium antimonyl tartrate. His reasons for so doing are that the latter drug is the less toxic while the local irritant effect, should a few drops escape around the vein in the course of administration, is not so severe as in the case of tartar emetic. Though the sodium salt has been used by him in only a small number of cases, a comparison of the relative efficiency of the two preparations administered in a similar

manner and dosage shows that it is "at least as effective and probably rather more so than tartar emetic." The sodium salt is now being tried by him on alternate days, on account of its lower toxicity—so far with good effect. It is noted that the same precautions should be observed in the use of this salt as in the case of tartar emetic.

Three deaths following the use of tartar emetic are recorded. The flask holding the solution was found to contain a heavy white precipitate and the importance is emphasized of never using a solution which is not absolutely clear. Three other patients for whom the same solution was used had severe febrile reaction and collapse but subsequently there was immediate and permanent cessation of the fever with rapid and complete recovery. The patients who recovered, as well as those who died, had previously received several doses of the same measurement. Chemical examination showed no change in the composition of the solution.

E. J. W.

NICOLLE (Charles) & LEBAILLY (Charles). *Multiplicité des rates et éruption péritonéale de tissu splénique chez un chien infecté de kala azar par inoculation de produits spléniques humains.*—*C.R. Soc. Biol.* 1918. Mar. 9. Vol. 81. No. 5. pp. 231-232.

A dog was intraperitoneally and intrahepatically inoculated on 30th June 1917 with spleen pulp from a child dead of kala azar. The animal was killed on the 16th September and the following splenic condition was found:

(1) There were two principal masses of spleen tissue. The one occupied the normal position of the organ and measured 110 mm. in length and 35 and 25 mm. at its widest and narrowest parts respectively. The second mass was situated underneath the first, was more compact and measured 70 mm. by 50 mm.

(2) Approximated to these two masses, were several islets of splenic tissue about the size of a pea, each consisting of an agglomeration of granular bodies, the size of a pin's head.

(3) Throughout the extent of the larger mass there were scattered isolated "granulations"; 116 such were counted. Numerous similar bodies were seen on the parietal peritoneum.

The various appearances described were microscopically identified as splenic tissue, and all contained L. D. bodies. In two other dogs, successfully inoculated with infantile kala azar, no similar appearances were found; nor were they in 16 dogs inoculated from dogs infected with human or canine kala azar.

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E. J. W.

LAVERAN (A.). *Sur les leishmanioses expérimentales, et en particulier sur la leishmaniose canine, chez la souris blanche.*—*Bull. Soc. Path. Exot.* 1918. Mar. Vol. 11. No. 3. pp. 205-216.

The author describes and summarises his work on the infection of white mice with the virus of natural canine leishmaniasis and Mediterranean and Indian kala azar.

Canine leishmaniasis. Twelve white mice were intraperitoneally inoculated by him with cultures of canine leishmaniasis. Each received 6 to 7 injections of 0.25 cc. of a strong culture. The result was negative in all cases.

Of 9 mice intraperitoneally inoculated with bone-marrow from dogs dead of leishmaniasis, two became strongly infected.

Of 29 mice intraperitoneally inoculated with liver or spleen pulp from mice affected with canine leishmaniasis seven were found on post mortem examination to be infected; nine show, at the time of writing, undoubted signs of infection; thirteen were negative and may be considered to be still doubtful.

Of 5 mice, twice unsuccessfully inoculated with bone-marrow from an infected dog and then reinoculated from an infected mouse, at least two became infected. The author concludes that mice are more susceptible to virus from other mice than to that from dogs.

The first signs of infection show themselves in 4-5 months. The chief of these and often the only one is increase in size of the abdomen and of the spleen.

The author has never seen, in mice infected with natural canine leishmaniasis, testicular tumours such as are seen in infections with *L. tropica*. In mice, intraperitoneally inoculated, the parasites may invade the testicles, which sometimes atrophy.

Palpation of the spleen to ascertain the presence of hypertrophy is carried out as follows:—An assistant grasps the mouse by the nape of the neck and the tail and holds it on its back upon a board. The abdominal muscles are relaxed in this position and the edge of the spleen is felt for in the left hypochondrium by passing the index or little finger backwards and forwards. When the spleen hypertrophies its inferior extremity rapidly extends beyond the ribs.

Mediterranean kala azar. Twenty-six white mice were intraperitoneally inoculated with spleen, liver or bone-marrow pulp from dogs or mice infected with Mediterranean kala azar. Four of these developed a severe, four a moderately severe, and thirteen a mild general infection. The remaining five did not become generally infected, or may have recovered at the time of examination. In mice killed 127 to 203 days after inoculation the disease was found to be retrogressing.

Indian kala azar. The results obtained with the virus of Indian kala azar were similar to those obtained with the Mediterranean variety.

The author refers to his previous work on inoculation of mice with *L. tropica* [see this *Bulletin*, Vol. 4, p. 401; Vol. 5, p. 277; Vol. 6, p. 230; Vol. 7, p. 84; Vol. 8, p. 9] and concludes that they are more easily infected by cultures of *L. tropica* than by cultures of *L. donovani*.

His general conclusions with regard to experimental leishmaniasis in these animals are as follows:

1. The infection produced by the virus of natural canine leishmaniasis bears a great resemblance to that caused by the virus of kala azar (Mediterranean or Indian); in both cases there is caused a visceral infection confined chiefly to the spleen and liver. This infection is difficult to produce with cultures of leishmania.

2. In male mice intraperitoneally inoculated with *L. tropica* (cultures, or material obtained from a human or animal source) there often appear in the testicular region after a certain lapse of time, swellings caused by the rapid multiplication of the parasites in the testicles and neighbouring connective tissue. These are often complicated

by cutaneous gangrene and oedema. When the infection invades the viscera, this occurs as a secondary manifestation.

The fundamental differences in localization of lesions in man, monkeys, and dogs between infections due to *L. donovani* and those due to *L. tropica* are less sharply defined in the mouse, and the cutaneous manifestations in that animal may or may not be complicated by visceral lesions.

E. J. W.

LAVERAN (A.). Boutons d'Orient expérimentaux chez un *Cercopithecus mona*; multiplication des boutons primaires par auto-inoculations. Le *C. mona* et un mangabey, morts au cours d'infections cutanées, ne présentent pas trace d'infection viscérale.—*Bull. Soc. Path. Exot.* 1918. Feb. Vol. 11. No. 2. pp. 130–136. With 2 plates.

The further history is given of two monkeys *Cercopithecus mona* and *C. fuliginosus*—successfully inoculated with *L. tropica*. For the previous communications see this *Bulletin*, Vol. 10, p. 69 and Vol. 11, p. 155.

The *C. mona* died nearly ten months after the original inoculation, having developed a number of secondary sores, the last one of which appeared about five weeks earlier. The autopsy showed that death was due to pulmonary disease. No leishmania were found in the liver, spleen, or bone-marrow. The case is remarkable on account of (1) the long duration of the skin condition, (2) the successive auto-inoculations, (3) the complete absence of visceral leishmaniasis in spite of the duration and severity of the lesions.

The *C. fuliginosus* died about six weeks after the original inoculation. Post mortem examination showed complete absence of leishmania in the viscera and bone-marrow, and nothing was found to explain the animal's death.

E. J. W.

STANCANELLI (Pietro). Sopra un caso di doppio bottone di Oriente (Leishmaniosi cutanea). [A Case of Double Oriental Sore (Cutaneous Leishmaniasis).]—*Giorn. Ital. d. Malattie Ven. e d. Pelle.* 1917. Vol. 58. Year 52. No. 3. pp. 204–216. With 1 fig.

An account of a very ordinary case of Oriental sore occurring in a man, aged 38, a native of Catania, who had never been out of Sicily. Two sores were present, one on the side of the nose and the other on the forearm, as shown in a photograph. Both healed under treatment with poultices and an ichthyol ointment. Leishman bodies were found in scrapings.

J. B. Nias.

LYSTER (Cecil R. C.) & MCKINSTRY (W. H.). A Case of Oriental Sore.—*Lancet.* 1918. Feb. 23. pp. 294–295. With 1 fig.

An account of a case, in which the parasite was found on microscopic examination, cured in 3 weeks by chlorine ionisation, 20 minutes for each application together with hypochlorite dressings. There were two circular sores about one inch in diameter. The strength of the current used was 20 milliampères and the size of the electrodes was 1½ in. by 1½ in. on each ulcer.

E. J. W.

GREIG (E. D. W.). Summary of the Results of the Observations on the Treatment of Oriental Sore by Antimonium Tartaratum.—*Indian Jl. Med. Res.* 1917. Oct. Vol. 5. No. 2. pp. 394-400.

A summary of 76 cases from Mesopotamia admitted into hospital at Karachi. For the purposes of the investigation they were divided into groups as follows:—(1) Control group of 24 cases. Most of these had been scraped in Mesopotamia and it is noted that the "histories" accompanying them were unsatisfactory. (2) Group of 18 cases treated by intravenous injections. (3) Group of 14 cases treated by intravenous injections + inunctions. (4) Group of 17 cases treated by oral administration + inunction. (5) Group of 3 cases treated by inunction only. These had been scraped in Mesopotamia and were healing on arrival in hospital.

For intravenous injection a 1 per cent. sol. of ant. tart. in normal saline was used. The best effect appeared to be obtained by daily administration of 7-10 cc. Oral medication was as follows: Ant. tart. grs. 5. Sod. bicarb. grs. 30, Syrup $\frac{3}{4}$ i, Aq. Chlorof. $\frac{3}{4}$ i, Aq. ad. $\frac{3}{4}$ iii, two drachms of the mixture t.d.s. The strength of the ointment used was 2 per cent. increasing to 15 per cent.

The following tables show details of the cases. (The groups referred to in Table I correspond to the numbered groups set out above. Table II gives the results of daily microscopic examinations in certain groups).

TABLE I.

	Groups.				
	1	2	3	4	5
No. of cases	24	18	14	17	3
Average duration of disease to admission to hospital	2.5 (months)	2.6 (months)	2.8 (months)	2.3 (months)	3 (months)
No. of days cases were under observation in hospital					
a. Average	21.9	28.2	32.7	25.1	18.6
b. Maximum	54	52	59	59	17
c. Minimum	5	16	19	4	15
No. of cc. of 1 per cent. A.T. administered intravenously.					
a. Average	Nil	71.5	83	Nil	Nil
b. Maximum	Nil	150	179	Nil	Nil
c. Minimum	Nil	20	22	Nil	Nil
No. of cases					
Healed	20	17	13	12	3
Improved	1	0	1	1	0
Not healed	3	1	0	4	0

TABLE II.

	Date on which <i>Leishmania</i> <i>tropica</i> was determined for first time in sore.	Date on which <i>L.T.</i> was last determined in sore.	No. of days elapsed before <i>L.T.</i> disappeared.	No. of cc. of 1 per cent. A.T. administered.
Group No. 1. Obs. No. 51	20/2/17	18/3/17	26	Nil
Group No. 2. Obs. No. 9	26/1/17	21/2/17	26	102
Obs. No. 76	18/3/17	28/3/17	10	89
Group No. 4. Obs. No. 26	26/1/17	9/3/17	42	Nil

No definite conclusions are drawn as to the efficacy of the various treatments.

E. J. W.

EVANS (W. S.). Treatment of Oriental Sore.—*Brit. Med. J.* 1918. June 8. p. 645.

The following treatment has been found effective among Indian troops in Mesopotamia :—

"Any undermined edge is cut away, and the surface of the ulcer is cleaned with carbolic lotion, and, if necessary, fomented to remove crusts and discharge. It is then covered with powdered corrosive sublimate obtained from the blue 8½ grain tablet. It is necessary to powder especially at or under the edge, where the chief infection lies. Care must be taken that the surrounding sound skin is free of powder. A dressing of dry gauze is then applied. Two hours later a hot fomentation is applied, and another at the end of two more hours. For the next two days hot fomentations twice a day are used until the sore presents a clean, bright red, vascular base, with a level or slightly sloping edge. The effect of the perchloride is to permeate every interstice of the wound, and in particular to destroy the infected margin. A short time after its application considerable pain ensues, which may last for twelve hours, but is not sufficient to require morphine. It is necessary to watch the temperature, as occasionally a dry blue scab is formed with pus pent up beneath. This must at once be raised to give exit to discharge. As a rule, fomenting keeps the surface sufficiently moist to allow of drainage of pus. When the surface of the wound is clean, new skin extends from the edges, and gradually covers the wound surface. With a daily dressing of 1 in 2,000 perchloride solution or eusol uninterrupted healing occurs, the time taken depending upon the size of the ulcer and varying from twelve days to six weeks."

E. J. W.

SEN (J. L.). Treatment of Oriental Sore. [Correspondence.]—*Indian Med. Gaz.* 1918. Apr. Vol. 53. No. 4. p. 155.

In a short letter the author reports good results in cases of open Oriental Sore by the local application of black wash or blue ointment. Details of 300 cases are to be published later. In cases of the disease before ulceration success has been obtained by means of mercury

ionisation. One hundred cases, diagnosed by microscopic examination, were thus treated. Mercury ionisation was also successful in ulcerating cases which did not yield to the ordinary mercurial application. The technique was as follows :—

“Ten thickness of lint soaked in perchloride of mercury solution 1 in 1,000 to 1 in 500 in distilled water, applied over the ulcer under the positive pole.

“A current of 10 to 150 millimetre amperes, was employed according to the power of endurance of the patient. Most of the ulcers healed up in two exposures of 15 minutes each. The hard and indurated ulcers required three to four exposures of 50 to 150 millimetre amperes for 20 minutes each.

“After the séance the immediate result showed shrinking of the indurated tissue, and the skin became dry and brownish black like parchment. The hard indurated ulcers lose the discharge and dry up. The ulcers heal up from 10 to 21 days.”

E. J. W.

MACHADO (Renato) & ALEIXO (Antonio). Um caso de leishmaniose mutilante. [A Case of Muco-Cutaneous Leishmaniasis.]—*Brazil Medico*. 1918. Jan. 12. Vol. 32. No. 2. pp. 9–11. With 6 figs.

A case of destructive leishmaniasis affecting the upper lip and the nose, in a negro, in which the disease was arrested by a course of injections of tartar emetic. A plastic operation was done afterwards on the mouth and nose, which greatly improved the patient's appearance, the conditions present being well illustrated by a series of five photographs. Otherwise the case does not present any particular novelty. Treatment was begun with daily doses of one centigramme of tartar emetic, and it was found that the limit of toleration was reached with a dose of 5 centigrammes. Ten centigrammes produced a strong reaction with fever, vomiting, diarrhoea and cardiac enfeeblement.

J. B. N.

ESCOMEL (E.). Quatre nouveaux cas de Leishmaniose américaine guéris par l'oxyde d'antimoine.—*Bull. Soc. Path. Exot.* 1918. May. Vol. 11. No. 5. pp. 372–375.

Four further cases of American leishmaniasis are described, successfully treated by injections of antimony oxide (Martindale). This preparation was advocated by the author in a previous paper [this *Bulletin*, Vol. 10, p. 70]. The local treatment recommended is similar to that already described by him [this *Bulletin*, Vol. 9, p. 236]. Stress is laid upon the necessity for continuance of treatment after apparent cure.

E. J. W.

DA MATTA (Alfr.). Eméticothérapie en la leishmaniosis tegumentaria. [Tartar Emetic in the Cure of Muco-Cutaneous Leishmaniasis.]—*Gaceta Med. de Caracas*. 1917. Sept. 30. Vol. 24. No. 18. pp. 169–170.

A note describing VIANNA'S treatment of leishmaniasis by tartar emetic as employed in Brazil. A case in point is described, in which

there were ulcers on the right leg and ankle, which healed completely under a course of 50 injections of tartar emetic, the dose ranging from 4 to 10 centigrammes of the drug. Local dressings were employed in addition.

J. B. N.

- i. TEJERA (Enrique). *Varios casos de Leishmaniosis americana en el Estado Zulia. Nota preliminar.* [Cases of Muco-Cutaneous Leishmaniasis from the State of Zulia (Venezuela).]—*Gaceta Med. de Caracas*. 1917. Aug. 31. Vol. 24. No. 16. pp. 145-146.
- ii. GONZÁLEZ RINCONES. *La esponja y la picada de pito.* (Una o dos leishmaniosis?) [Esponja and Picada de Pito. Are either Leishmaniasis?]*—Ibid.* Oct. 15. No. 19. pp. 176-177.

i. Notes of 5 cases of muco-cutaneous Leishmaniasis without particular interest. The local name for this affection is "*Picadas de Pico* or *Pico*," magpie's or woodpecker's bites.

ii. The author has received from Dr. TEJERA specimens which place beyond doubt the leishmanial nature of the disease locally known in Colombia as *picada de pito* (pito = magpie, being the local name for a species of Reduviid bug).

J. B. N.

PEDROSO (Alexandrino M.). *Sobre a vitalidade da Leishmania tropica no cadaver. Trabalho apresentado ao Primeiro Congresso Medico Paulista.* [On the Vitality of *L. tropica* in the Dead Subject. Memoir presented to the First Medical Congress at San Paulo.]—*Ann. Paulist. Med. e Cirurg.* 1917. Jan. Year 5. Vol. 8. No. 1. pp. 8-10.

LIGNOS and DI CRISTINA have both noted the fact that after death it is often impossible to recognize the presence of Leishman-bodies in tissues in which they have been demonstrated during life. The author of the present paper had occasion, in the year 1913, to treat for leishmaniasis with injections of tartar emetic a patient who died, on the fifth day, from an attack of intercurrent pneumonia. The presence of Leishman-bodies had been demonstrated during life by means of cultures on Nicolle's medium. At the autopsy made 36 hours after death, the body having been kept in a refrigerator, it was impossible to demonstrate the presence of Leishman-bodies microscopically in smears from the different organs. Cultures from the same material, however, on Nicolle's medium, after an incubation period of 10 days, gave a growth as before. The author wishes to signalize this fact.

J. B. N.

ESCOMEL (Edmundo). *Leishmaniasis.*—*Oronica Med.* Lima. 1917. Sept. Vol. 34. No. 651. pp. 334-340; 1918. Mar. & Apr. Nos. 657 & 658. pp. 78-84; 116-120.

A summary of recent literature on the subject of leishmaniasis, especially of the American varieties. Contains nothing original, but will be useful for reference.

J. B. N.

- i. KENNEDY (J. C.). Six Cases of Kala-Azar. (1) Their Treatment with Intravenous Injections of Tartar Emetic; (2) Notes on the Epidemiology.—*Jl. Roy. Army Med. Corps.* 1918. Feb. Vol. 30. No. 2. pp. 209-215. With 2 plans.
- ii. STERLING-OKUNIEWSKI (Stefan). Der Blutdruck im Verlaufe von Rückfallfieber.—*Deut. Med. Woch.* 1918. Mar. 7. Vol. 44. No. 10. pp. 265-266.
- iii. KORNIS (John H.). Antimony in Kala-Azar.—*China Med. Jl.* 1918. Jan. Vol. 32. No. 1. pp. 26-29. With 1 plate.
- iv. CHRISTOPHERSON (J. B.) & NEWLOVE (J. R.). A Note on Oriental Sore.—*Lancet.* 1918. June 8. p. 802. With 1 fig.

i. An account of six cases of Indian kala azar in British soldiers who appear to have contracted the disease while stationed in the same barracks.

ii. The disease appeared to exert no definite influence upon the blood-pressure in the 18 cases investigated.

iii. The author's discouraging results in the eleven cases of kala azar described, would appear to be largely due to lack of persistence in the treatment by intravenous injections of tartar emetic.

iv. On account of the probable more frequent occurrence in the future of the disease in England a short account is given of the clinical features, diagnosis and treatment by intravenous injection of tartar emetic.

E. J. W.

RELAPSING FEVER.

LEBOEUF (A.) & GAMBIER (A.). *Sur deux cas de Spirochétoze humaine observés à Brazzaville (Moyen-Congo).*—*Bull. Soc. Path. Exot.* 1918. May. Vol. 11. No. 5. pp. 359-364.

Two cases of relapsing fever in natives are described. In one of the patients, 14 years of age, who died with well-marked cerebral symptoms, spirochaetes were found in the cerebro-spinal fluid as well as in the blood. The second patient was aged seven. In both, and also in an inoculated monkey, the blood showed a pronounced lymphocytosis. This was also apparent in the cerebro-spinal fluid of the fatal case, in which lymphocytes constituted 56·6 per cent. and polymorphonuclears 42·5 per cent. of the cells, the remainder being large mononuclears and endothelial.

E. J. W.

HERON (D.). *Relapsing Fever in Seistan.* [Correspondence.]—*Indian Med. Gaz.* 1917. Oct. Vol. 52. No. 10. p. 378.

In a short letter, the admission to the Seistan Consulate Hospital (Persia) is recorded of 42 cases of relapsing fever between February and May 1917. Diagnosis was confirmed by microscopic examination of the blood. It would appear not to have been imported from India or Afghanistan. The disease was also present in the villages of Seistan. The writer considers that, on account of the conditions under which his patients were living, *Argas persicus* could be excluded as a transmitter of the disease.

E. J. W.

YACOB (Kamel). *Spirochaetal Dysentery and Post-Spirochaetal Paralysis during an Epidemic of Relapsing Fever.*—*Practitioner.* 1917. Nov. Vol. 99. No. 5. pp. 487-489. With 4 charts.

Four cases of relapsing fever are recorded occurring during an epidemic in Egypt, in which dysenteric symptoms formed the outstanding feature. In one of them which proved fatal, the pathological changes in the intestine consisted of slight inflammation of the mucous membrane of the colon with small areas of submucous haemorrhage and of gangrene. These areas were also present in the beginning of the ileum. There was no ulceration. The patient was an old man and had been ill for a few days before admission to hospital.

Three cases of post-spirochaetal paralysis are recorded. The muscles affected were the deltoid, the rhomboids, and the serratus magnus. There were sensory symptoms in the form of numbness, but no actual anaesthesia. The condition is regarded as a toxic neuritis affecting chiefly the roots of the fifth and sixth cervical nerves. The symptoms developed a few days after the pyrexia, either in the first or second attack. The author is unable to give an opinion in regard to prognosis but mentions a case in which the paralysis still persists after the lapse of nine months.

E. J. W.

LEISHMAN (William B.). *A Note on the "Granule-Clumps" found in *Ornithodoros moubata* and their Relation to the Spirochaetes of African Relapsing Fever (Tick Fever).—*Ann. Inst. Pasteur*. 1918. Feb. Vol. 32. No. 2. pp. 49–59. With 2 figs.

In his earlier papers on this subject the author noted that the "granules were almost constantly found in various tissues of *Ornithodoros* and that the inoculation of tissues containing such granules, but, as far as could be determined, no spirochaetes, frequently resulted in the production of spirochaetosis in mice. The occurrence of similar granules in the eggs of the fecundated female tick and my almost invariable failure to find spirochaetes in such eggs, even when the mother tick had been heavily infected shortly before, further suggested to me that it might be in this form that the virus passed to the next generation of ticks."

Further observations are now placed on record which the author considers support his views on the nature of the granules. Certain points which have been found to require revision are to be dealt with in a later communication. The later experiments have been carried out largely with the aid of the dark-ground method of examination, which at the period of the earlier work was not in general use.



Fig. 1.

Nos. 1–6.—"Granule-clumps" from the tissues of *Ornithodoros moubata*.

Nos. 7–10.—Early stage in the extrusion of Spirochaetes from granule-clumps.

Nos. 11–21.—More advanced stages of extrusion of Spirochaetes from granule-clumps.

[Reproduced by permission from the *Annales de l'Institut Pasteur*.

The granule clumps are recognized in this procedure by (1) the size, number, and form of the granules forming a clump; these are more or less uniform; (2) characteristic brightness and yellowish-white colour; (3) the granules are embedded in a well-defined but

* This memoir will appear also in a volume celebrating the Jubilee of M. E. METCHNIKOFF.

faintly refractile matrix. This is only occasionally seen in stained specimens and is regarded as suggestive of a vital connection between the constituents of the clump.

After ingestion by the tick, the spirochaetes remain motile for several days. The duration of motility depends upon the temperature at which the insects have been kept. Some then lose their motility and collect together in tangled masses while the chromatin breaks up into fragments. These are probably the chromatin granules found in the Malpighian tubules and other tissues of the tick. Other spirochaetes develop a "bud" which may be lateral or terminal and is thought to be the origin of the granule clump which may later develop into another spirochaete. Such a lateral bud has been seen to separate from a spirochaete after being in active rotatory movement with it for half an hour. The bud contained 3 or 4 highly refractile granules and corresponded accurately in appearance to the isolated granule clumps described.

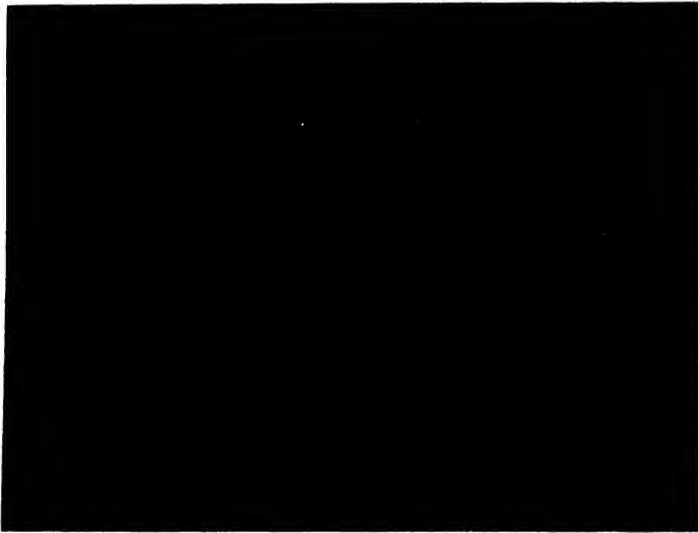


Fig. 2.

Nos. 1-7.—Longer forms of Spirochaetes, in association with granule-clumps.

Nos. 8-14.—Young Spirochaetes.

[Reproduced by permission from the *Annales de l'Institut Pasteur*.

Later, in ticks from the same batch, it was found that the spirochaetes disappeared, but that provided the insects had been kept at a comparatively high temperature they suddenly reappeared in the shape of "young forms." These were however "much shorter than the others, the smaller being 3-4 μ in length and showing only 2 or 3 curves." In the course of the next day or two typical large forms are seen in abundance. In several such experiments the second crop of spirochaetes has disappeared, to be followed by a new crop in six or seven days. There thus appears to take place a regular relapse in the tick, analogous to what occurs in man.

As in his earlier experiments the author has seen young spirochaetes apparently attached to a granule clump, suggesting a possible development from a granule. By the dark ground method they were seen to be actively motile. Progressive growth and development or separation from a clump was not observed. This is explained on the assumption that the strong illumination during long continued examination exerted an inhibitory influence.

The granule clumps were usually situated at one end of the spirochaete, but occasionally were placed centrally or subterminally. The view that these forms may represent a degenerative change in adult parasites seems to be negatived by the observation that in other ticks of the same batch spirochaetes were absent or rare for some days previously, and that again in other ticks of the same batch examined on the day following that on which these forms were seen, the tissues were found to be swarming with actively motile spirochaetes. Moreover no dead or degenerate spirochaetes were found at the time these forms were observed. There are two illustrations of granule clumps and spirochaetes as seen by dark ground illumination.

In contradistinction to MARCHOUX and COUVY who recommend gentian violet for staining *S. duttoni*, the author states that his own modification of the Romanowsky method is successful for staining this organism in tissues, such as muscle-fibres, when gentian violet fails. The same claim is made in regard to *Treponema pallidum* in films.

In regard to the phenomenon of granule shedding as observed by the dark-ground method in connection with *S. duttoni*, it is mentioned that a granule, after extrusion, appeared to re-enter the body of the spirochaete. This was observed to occur, in the case of one organism, no less than seven times in three quarters of an hour. It is suggested that, at any rate in this instance, the phenomenon may have a physical rather than a vital explanation.

The author draws attention to the utility of the dark-ground method for examination of *dry* films.

E. J. W.

TOEPFER (H.). Zur Uebertragung des Erregers des europäischen Rückfallfiebers durch die Kleiderlaus. [Transmission of European Relapsing Fever by the Body Louse.]—*Deut. Med. Woch.* 1918. Feb. 28. Vol. 44. No. 9. pp. 239-240.

Töpfer criticises J. KOCH's article summarised in this *Bulletin*, Vol. 10, p. 268. He endorses H. MAYER's view [*loc. cit.* Vol. 11, p. 196] that some of KOCH's figures of "spirochaetes" found in the louse, are in reality spermatozoa. He holds that spirochaetes do not undergo a developmental phase in the louse*. He has been unable to confirm the existence of granule forms described by some English investigators. KOCH does not adduce proof of his statement that the louse conveys infection by biting and his conclusions are discounted by his having mistaken spermatozoa for spirochaetes. The available evidence points to infection being conveyed mechanically by crushing of the insects and not by biting. Thus in a severe epidemic of relapsing

* See note on page 195 of Vol. 11 of this *Bulletin*.

fever doctors and orderlies remained for the most part free from the disease though extensively bitten, and such as contracted it did so only after a considerable time and after becoming very verminous.

The author states that he has examined ovaries and also young lice for presence of spirochaetes as evidence of inherited infection but with negative result.

E. J. W.

WIESE (Otto). *Zur Uebertragung des Rückfallfiebers*. [The Transmission of R. F.].—*Deut. Med. Woch.* 1918. Jan. 17. Vol. 44. No. 3. pp. 60–62.

A short critical paper on the views commonly held concerning the conveyance of relapsing fever. The author is of opinion that the head and perhaps also the crab-louse, as well as the body-louse, are the means of transit from person to person. He bases his opinion on the epidemiological observation that the disease disappears coincidently with the eradication of the insects. In an epidemic observed by him, in which, at first, only isolated cases occurred, a sudden increase was noticed among persons afflicted with lice who had had their infested hair, which was often densely matted, removed about seven days previously. This increase was ascribed to the fact that the scissors and razors used had become blunt from use so that abrasions of the skin occurred with consequent infection from lice which had been accidentally crushed.

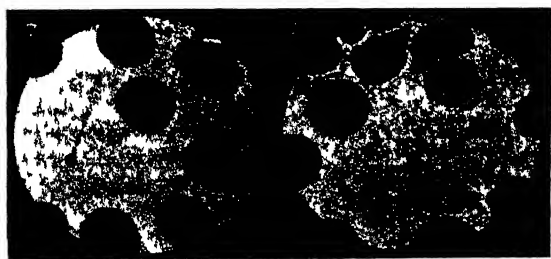
The question of transmission by the bed-bug was also investigated. In an epidemic the author failed to discover any of these insects. He also examined 45 bugs for presence of spirochaetes, eight days after they had been allowed to feed upon a case of relapsing fever. The result was negative.

E. J. W.

- i. KOCH (Jos.). *Die Beziehungen des Rückfallfiebers zur Febris quintana s. Wolhynica*. [The Relation of Relapsing Fever to Five Day Fever.].—*Deut. Med. Woch.* 1917. Nov. 8. Vol. 43. No. 45. pp. 1412–1415. With 10 figs.
- ii. WERNER (H.). *Die Beziehung des Rückfallfiebers zur febris quintana*.—*Münch. Med. Woch.* 1918. Mar. 19. Vol. 65. No. 12. p. 324.
- iii. KOCH (Jos.). *Die Beziehung des Rückfallfiebers zur febris quintana. Bemerkungen zu dem Aufsatz H. Werners in Nr. 12 ds. Wschr.*—*Ibid.* Apr. 30. No. 18. p. 487.

i. Febris quintana (Wolhynica) is considered to be a mild abortive form of febris recurrens. The tenderness of the shins which, by many, is held to be characteristic of the former, is found, in the author's experience, in a third of the cases of relapsing fever.

By staining blood-films fixed in methyl alcohol with dilute carbol-fuchsin (1 cc. of ordinary concentrated c.f. as used for staining tubercle bacilli diluted with 5 cc. distilled water, the stain being poured on the slide and at once washed off with tap water) bodies are seen which the author considers to be involution forms of *S. obermeieri*. The film should show these, stained a deep red, on a white ground; the red blood corpuscles are stained red. These involution forms fall



into four groups : (a) Like a bent chain of badly stained streptococci, often swollen at the ends, sometimes resembling a diphtheria bacillus with bipolar staining. Some may be found attached by one extremity to a red blood corpuscle (figs. 1, 2, 3). (b) Similar bodies, but in which the more or less uniform thickness is interrupted by swellings here and there (figs. 4, 5, 6). (c) Similar bodies consisting of a chain of rounded swollen segments of variable size (figs. 7, 8). (d) Irregular polymorphic forms which have lost their thread-like appearance (fig. 9). (Fig. 10 shows masses of *S. obermeieri* occurring in a case of relapsing fever with severe jaundice).

The following are the author's reasons for his opinion of the nature of these bodies :—

(1) They are found in the blood with typical *S. obermeieri*, especially during and shortly after pyrexia when the spirochaetes are being killed by the bactericidal action of the blood. They are also seen after injection of salvarsan.

(2) All gradations can be traced between spirochaetes whose characteristic shape is still recognizable and these involution forms.

(3) In hanging-drop preparations the chains described above (a) were seen to have a movement which though feeble was characteristic of *Sp. obermeieri*.

These involution forms are, in many cases, very numerous, though characteristic spirochaetes may be absent. Giemsa's stain is almost, and the Indian ink method entirely, useless for their demonstration.

The view that febris quintana is only a form of febris recurrens is supported by the fact that they occur together in various parts of the Eastern Front. Cases of the former have been variously labelled on account of failure to demonstrate spirochaetes in the blood. The author considers them to have been abortive forms of relapsing fever.

ii. The author criticises J. KOCH's article and states that the involution forms figured by him are artefacts. In contradistinction to KOCH, the writer considers that relapsing and five day fever are two distinct diseases. His reasons may be summarised as follows :—

Typical five-day fever temperature charts are seen in patients who develop the disease while in hospital for other complaints.

Inoculations of men, mice, and guinea-pigs with blood from patients suffering from five day fever have failed to produce a relapsing fever infection.

Human inoculations with blood from five day fever patients have resulted in the production of a five day fever temperature curve while spirochaetes could not be demonstrated in the blood.

Experimental infection by means of lice produced similar results, and examination of lice by various investigators for presence of spirochaetes, after being fed on five day fever patients, were negative.

Febris quintana is endemic in certain localities, whilst relapsing fever occurs in well-defined and localised epidemics. The author is acquainted with numerous localities where many cases of five day fever occurred to the exclusion of relapsing fever and vice versa

There is a marked difference in the temperature curves in the two diseases. Spirochaetes can be demonstrated with ease in the blood of relapsing fever patients. Salvarsan has a specific action in relapsing fever, but fails in five day fever.

iii. In a brief note KOCH explains that on account of his duties on active service he is unable at the moment to reply to Prof. WERNER's criticisms. He intends to do so later and in the meantime contents himself with a denial that the bodies figured are artefacts and states that his views as to their nature are shared by Prof. ZETTNOW (Berlin).

E. J. W.

LOEWY (Robert). *Zur Klinik und Therapie des Rückfallfiebers.*—*Med. Klinik*. 1918. Jan. 20. Vol. 14. No. 3. pp. 62-63. With 3 charts.

The chief interest of this paper lies in the description of an atypical case, assumed on clinical and epidemiological grounds to be one of relapsing fever (or of febris Wolhynica). It occurred among 16 other undoubted cases during a period of three weeks in a camp for Russian prisoners of war. Repeated examination of blood smears failed to reveal the presence of spirochaetes. There were five attacks of fever of 24 hours' duration only. The apyrexial intervals were 3, 11, 7 and 15 days. The spleen was palpable. There was severe pain in the shins during the attacks of fever. No malarial parasites were found in the blood and the Widal test was negative. The epidemic ceased as soon as energetic de-lousing measures were instituted.

E. J. W.

TAUSIG & JURINAC. *Ueber einen Fall von Milzruptur bei Febris recurrens.* [A Case of Ruptured Spleen in R. F.]—*Wien. Klin. Woch.* 1917. Dec. 27. Vol. 30. No. 52. p. 1651.

The clinical and post-mortem record of a case of relapsing fever (diagnosis confirmed by blood examination) in which spontaneous rupture of the spleen occurred.

The patient was a soldier, 47 years of age, afflicted with chronic nephritis and cardiac hypertrophy.

E. J. W.

DUMITRESCO-MANTE. *Injectiões intraveineuses d'arrhénal dans la fièvre récurrente.*—*Presse Méd.* 1918. Mar. 21. Vol. 26. No. 17. pp. 155-156.

The author states that the intravenous injection of one dose of 3 gm. arrhénal (di-sodium methylarsenate) in 10 cc. distilled water acts as a specific in relapsing fever. Eight cases, apparently at Bucharest, were thus treated, and in six no relapse occurred. The patients were under observation for a period of from 25 days to 5 months after the first attack. In the seventh case a second very mild attack of 48 hours' duration occurred 9 days after the first, no spirochaetes being found in the blood. In the eighth case there was a rise of temperature to 40° C. for a few hours only, nine days after the first attack. As the pyrexia was of such short duration and no spirochaetes were found in the blood, it is considered not to have been a true relapse. In all the eight cases, the temperature fell about 26 hours after the injection. There were no untoward symptoms.

E. J. W.

PORTOCALIS (A.). *Le traitement de la fièvre récurrente.*—*C. R. Soc. Biol.* 1918. Mar. 9. Vol. 81. No. 5. pp. 273-274.

Eighty-two cases were treated with intravenous injections of galyl not exceeding 0.2 gm. per dose. Forty-three of these received one dose only, at the height of the first attack. The immediate effect was to cut it short, but thirty-eight per cent of the 43 cases relapsed. Other cases [number not stated] received one or two injections, but only in an apyretic interval. Sixty per cent. of these relapsed. This is explained on the supposition that the drug then acted upon resistant forms of *S. obermeieri*. The relapse in these cases was delayed. The best results were obtained when two injections were given, one during the first attack, the second 4-5 days after the temperature had fallen. The number of cases so treated is not given but the author states that 25 per cent. relapsed. The result of treatment by injection of serum (collected during the first apyretic interval) either into the same or other patients, as also by intravenous medication with cyanide of mercury, was not encouraging.

E. J. W.

PINO POU (R.). *Aclaraciones oportunas. Historia del descubrimiento de la fiebre recurrente en Venezuela (Relapsing Fever).* [Particulars of the First Case of Relapsing Fever recorded in Venezuela.]—*Gac. Med. de Caracas.* 1918. May 15. Vol. 25. No. 9. pp. 93-97. With 1 chart.

The patient was a man who was attacked with high fever. He declared himself to have always been refractory to malaria, but both liver and spleen were very much enlarged. A blood film, stained for malaria parasites, showed, instead, plenty of spirochaetes. The temperature rose again after the customary interval, and inoculations were then made into various laboratory animals. The results were negative with monkeys, rabbits, guinea-pigs, dogs and fowls, and positive with mice and rats, indicating that the spirochaete was of the American variety. It was found possible to infect rats by using the common bed-bug as transmissor, but rat and mice fleas would not convey the infection. Lice were not tried.

J. B. N.

VIOLLE (H.). i. *Spirochétose pulmonaire (Bronchite sanglante).*—*Bull. Soc. Path. Exot.* 1918. Jan. Vol. 11. No. 1. pp. 39-47. With 1 fig.

ii. *Note sur la spirochétose broncho-pulmonaire ("bronchite sanglante.")*—*Bull. Acad. de Méd.* 1918. June 4. 3 Ser. Vol. 79. Year 82. No. 22. pp. 429-431.

i. A description of five cases of bronchial spirochaetosis (in all of which the presence of *S. bronchialis* was demonstrated), treated at the naval hospital of Saint Mandrier at Toulon. Four were Chinamen; the fifth was a Frenchman—a hospital-ship attendant. There appeared to be no causative connection between them. One of the cases described suffered from a buccal ulcer on admission to hospital before the development of pulmonary symptoms. Bacteriological examination of this lesion revealed the presence of spirochaetes identical

in appearance with *S. bronchialis* and occurring side by side with the fusiform bacilli and spirochaetes commonly found in ulcerative conditions of the mouth. It is suggested that bronchial spirochaetosis may, in some cases, be due to a lesion originally localized in the mouth. The author states that he has failed to reproduce the disease in the rabbit, guinea-pig, or pigeon by injection of infected sputum into the trachea. He recommends the silver-nitrate method of FONTANA, as modified by TRIBONDEAU, for the demonstration of the organism in smears.

ii. In the first three months of 1918, more than 30 cases of pulmonary spirochaetosis occurred at the Naval hospital at Toulon. The appearance of the sputum—like red-currant jelly—was diagnostic. Smears stained by the Fontana-Tribondeau method showed the presence of large numbers of spirochaetes of variable size and shape. No tubercle bacilli were found in any of the cases. The spirochaetes were sometimes present to the almost complete exclusion of other organisms. They disappeared with the subsidence of symptoms and were never found in the nasal mucus, urine, or blood. The Wassermann reaction was negative.

The disease is relatively benign. The onset is gradual and the general condition of the patient is good. There is no pyrexia. There is much coughing, especially at night, the expectoration being sometimes blood stained and at other times mucopurulent. The pulmonary signs are indefinite. The condition runs its course in about one month. Relapses are frequent. The disease appears to be contagious and is thought to have been introduced into France by troops from the Levant.

E. J. W.

LEGER (André) & LE GALLEN (R.). *Spirochétose des poules au Sénégal. Son évolution clinique.*—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 435–438.

The authors describe in detail the clinical symptoms of fowl spirochaetosis in Senegal due to *S. newuzzi*. They find that the pathogenic effect of the organism described by BRUMPT differs from that affecting the animals with which they experimented in that, with their birds, spontaneous cure failed to take place in a certain number of cases and that these lapsed into a chronic condition, for the detailed description of which the original paper must be consulted.

E. J. W.

Row (R.). i. *On a New Species of Spirochaete isolated from a Case of Rat-Bite Fever in Bombay.*—*Indian Jl. Med. Res.* 1917. Oct. Vol. 5. No. 2. pp. 386–393. With 1 chart & 2 plates.

——. ii. *Cutaneous Spirochaetosis produced by Rat Bite in Bombay.*—*Bull. Soc. Path. Exot.* 1918. Mar. Vol. 11. No. 3. pp. 188–195. With 2 plates.

i. The case from which the organism was isolated is described in detail. There was a definite incubation period of ten days.

The bite, which had completely healed, then became inflamed and a remittent pyrexia commenced. At each relapse of the fever the eruption [see ii, below] appeared in fresh crops. There was no lymphadenitis or lymphangitis. The Wassermann reaction (FLEMING's modification) was negative. Examination of blood films failed to reveal the presence of spirochaetes and cultures made from the peripheral blood were negative. Films made from the blood and serum obtained from the papular eruption showed a few fine spirochaetes (illustrated in an excellent coloured plate) 2-3 μ in length with "two, but at times three or even four fairly open spirals, the longer forms showing a distinct suggestion of a transverse division in the middle, so that the fully developed young spirochaetes show only two spirals."

Two mice injected subcutaneously with a minute quantity of blood and serum squeezed out of a papule showed spirochaetes in the peripheral blood on the 8th and 10th day. The organisms presented for the most part the same characters as those obtained direct from the patient. One of the mice was killed two days after it was found infected. The spleen was 4-6 times the normal size; the liver was slightly enlarged. Smears made from these organs and from the bone-marrow, lungs, tracheal mucous-membrane, and scrapings from the palate were negative as to spirochaetes. They were found in the heart blood, but not in greater numbers than in the peripheral circulation. Dark ground examination showed "two distinct movements, viz., the one, a spirillar movement along the curls, and the other a backward and forward motion, showing occasionally a jumpy tendency."

Spirochaetes were still present in the blood of the second mouse 36 days after it was first discovered to be infected. There was a distinct increase in the number of organisms four days after they were first found.

ii. The author describes the cutaneous manifestations of the disease in 5 cases (including the one referred to above). These may develop during any of the attacks of the remittent pyrexia. Their nature and distribution varies. In one case five spots appeared 15 days after the bite and 5 days after the first exacerbation, two being on the side of the chest, petechial in character, and three on the neck, which were papular. In another case four thick cutaneous nodules appeared on the right thigh three weeks after the bite and during the fourth exacerbation of fever. In a third case five spots appeared on the left thigh and three on the right, urticarial in character, ten days after the bite and simultaneously with the febrile symptoms. In a fourth case there were about eighteen papules distributed all over the body. They appeared ten days after the bite together with the fever. In the fifth case (i, above) there was a generalized papular eruption twenty days after the bite at the third exacerbation of fever. The author states that spirochaetes can invariably be demonstrated in the cutaneous lesions. "In no case could the spirochaetes be recovered by the injection of peripheral blood of patients into mice."

Attention is drawn to the fact that the seat of the primary lesion (bite), which may have healed, becomes painful and inflamed after a definite incubation period of 7-10 days synchronously with the development of the first attack of fever. The paper concludes with a

detailed reference to recent work on rat bite disease and the author discusses the respective features of his "Bombay" spirochaete and those of the Japanese investigators [see this *Bulletin*, Vol. 11, p. 189] which he summarises as follows:—

"(1) The Spirochaetes derived from the human lesion are identical with those recovered from the peripheral blood of the white mouse or guinea pig infected with the human material.

"(2) The Bombay Spirochaete is smaller than even the small variety of FUTAKI and the small type of KITAGAWA and MUKOYAMA and practically of uniform size.

"(3) The broad distinction made by FUTAKI in the long and short forms according to the situations the virus is derived from (viz., long form from lymphatic nodules and short ones from peripheral blood) does not hold good in Bombay where all that are found are short and 1.5 to 2 μ in length, any slightly longer forms detected being distinctly division forms of the same.

"(4) These are found only in the cutaneous lesions and not in the peripheral blood of the Bombay cases.

"(5) No lymphadenitis has been noticed in all the cases under observation.

"(6) I have not been able to satisfy myself as to the presence of terminal flagella although the ends of the Bombay Spirochaete are pointed.

"(7) The behaviour of the Bombay Spirochaete to experimental animals is different from those of the Japanese type. In mice and guinea pigs it produces a low type of infection, the spirochaete being demonstrated even 6 months after the infection, the animals being apparently quite well, although one guinea pig and one white rat succumbed to the infection nearly 3 months after the infection, and 15 days respectively.

"(8) With all these differences, the interest to the record here given seems to me the strong connection with and the identity of the spirochaete derived from the human cutaneous lesions resulting from rat bite and the organisms recovered from animals infected with the material derived from the human lesion."

E. J. W.

WOODCOCK (H. M.). The "Thick Drop" Method for the Detection of Scanty Spirochaetes in the Blood.—*Brit. Med. Jl.* 1918. May 25. p. 589.

The following are the essentials of the method described.

A film about $\frac{3}{8}$ in. in diameter is spread. Too great thickness is no advantage on account of difficulty in dehaemoglobinization and presence of fibrin. After thorough drying in air, gently heat by passing over a flame two or three times. Lake either with (1) distilled water or (2) acidulated methyl alcohol (10–12 drops HCl to 50 cc. methyl alc.). If the latter is used the film is subsequently well rinsed with distilled water and dried. Method (2) has the advantage of fixation by alcohol. In method (1) the film is apt, in the course of manipulation, to be removed from the slide; on the other hand laking is more complete and rapid and there is less fibrin formation.

Staining may be by the Giemsa or Leishman method but aniline gentian-violet (twenty seconds) is recommended.

It is mentioned that if a thick film is to be examined for scarce malarial parasites laking according to method (2) is to be preferred as distilled water is very liable to disintegrate these organisms.

E. J. W.

SPEHL (P.). *Procédé de coloration des Spirilles par le violet formolé.*—*C. R. Soc. Biol.* 1918. Mar. 23. Vol. 81. No. 6. pp. 305-306.

The following technique is recommended for staining spirochaetes.

1. Make a thin film. Dry.
2. Formol acetic acid (formalin 2, acetic acid 1, distilled water 97) cold for 5 minutes. Then renew the solution twice.
3. Ten per cent. aqueous solution chromic acid for 10 minutes.
4. Absolute alcohol for 2 minutes. Flame.
5. Hot formol gentian-violet for 2 minutes. (Gentian violet 1, formalin 4, alcohol 10, distilled water 85).
6. Wash quickly in water.
7. Lugol's solution for 5 minutes.
8. Wash, dry without heat, mount.

The cellular elements are strongly coloured violet (protoplasm) and black (nuclei). Bacteria are black. Spirochaetes are violet or black, even such as *S. icterohaemorrhagiae* which are difficult to stain.

The author claims for his technique that the spirochaetes are intensely stained, that the finer forms do not appear thickened as with the Fontana-Tribondeau method and that it is hence particularly suitable for differential diagnosis and for microphotography.

E. J. W.

LIPP (Hans). *Eine einfache Schnellfärbungsmethode von Spirochäten.* [A Simple Method of Staining Spirochaetes.]—*Dermat. Woch.* 1917. Nov. 24. Vol. 65. No. 47. pp. 1048-1049.

The following method is strongly recommended for staining spirochaetes (including *S. pallida*):

1. Dry the film in air.
2. Apply 5 drops of 1 per cent. sol. of liquor potassae.
3. Without pouring off at once add several drops of ordinary watery fuchsin (fuchsin dissolved in 96 per cent. alcohol and diluted 1:20 water).
4. Allow to stand for 4 minutes during which time the beautiful red fuchsin colour will become a dirty red, the solution finally becoming colourless.
5. Wash with water and dry on blotting paper.

Spirochaetes should stand out well on a fairly clear background. The laked blood corpuscles appear shadowy. The smear should be made from serum containing as small an admixture of blood as possible.

E. J. W.

KON (Yutaka) & WATABIKI (Tomomitsu). *The Presence of Spirochetes in the Kidney.*—*Jl. Amer. Med. Assoc.* 1918. May 25. Vol. 70. No. 21. pp. 1522-1523.

By means of stained films the authors examined (1) fifty cases post mortem, mostly of acute or chronic nephritis and (2) twenty-six cases during operation. Twenty-four of the latter were cases of tuberculous kidney, the remaining two being hydronephrosis and nephrolithiasis. Among class (1) spirochaetes were found in twenty-five and among class (2) in fifteen.

Morphologically the organisms were divisible into three types, (1) resembling *S. pallida*, (2) showing an irregularly curved spiral, (3) broader than the preceding types and with coarser and less regular curves.

The authors appear however to be in doubt whether the spiral bodies observed are actually spirochaetes. They summarize the results of their investigation as follows :

"1. By Levaditi's method we have found many spirochetes in the hyaline casts and hyaline substances in urinary tubules, without relation to any diseases. Further and more minute attention must therefore be paid to the study of spirochetes in the kidneys.

"2. Our spirochetes are found not only in the casts, but also in the hyaline or granular substances located in the cortical substances, in urinary tubules, in Bowman's capsule, and in cysts. But they have not yet been found in the blood vessels, in the interstitial tissues, or in the cells.

"3. Our spirochetes may be divided into three types."

E. J. W.

NOGUCHI (Hideyo). **The Spirochetal Flora of the Normal Male Genitalia.**—*Jl. Experim. Med.* 1918. June 1. Vol. 27. No. 6. pp. 667-678. With 3 plates.

Attention is drawn to the importance of accurate knowledge of the normal spirochaetal flora of the urogenital region before an aetiological relationship can be established between a spirochaete and a disease in which the organism may be found in the urine.

The author gives a critical analysis, with illustrations, of the normal spirochaetal inhabitants of smegma and concludes that practically three types only are found: coarse, medium, and minute. Their morphological and cultural characteristics correspond to *Spirochaeta refringens*, *Treponema calligyrum* and *Treponema minutum*, respectively. *Treponema calligyrum* may be identical with the organism designated *Spirochaeta gracilis* by LEVADITI and STANESCO in 1909.

No spirochaetes were found in films from urine or from the urethral mucous membrane. The author thinks this may be due to the paucity of specimens examined.

The three varieties of spirochaetes found in smegma "represent practically every form hitherto described by NANKIVELL and SUNDELL, and by PATTERSON in the specimens of urine from trench fever cases. The urethral flora as studied by STODDARD seem to contain more varieties, but except for those of his more detailed morphological descriptions, every form observed by him is among those found in smegma."

Those interested in the detailed description of the three types and their immunological and cultural characteristics should consult the original paper.

E. J. W.

CROWELL (B. C.) & HAUGHWOUT (F. G.). **Observations on the Incidence of Intestinal Spirochaetes in the Philippine Islands.**—*Jl. Infect. Dis.* 1918. Mar. Vol. 22. No. 3. pp. 189-193.

The authors, writing from the Departments of Pathology and Medical Zoology, University of the Philippines, report that they examined a series of 50 stools, representing 46 hospital cases suffering from various diseases. 35 of these (73 per cent.) contained spirochaetes; 17 (48 per cent.) also contained entamoebae. The entamoebae could

not be differentiated on account of the age of many of the specimens when examined. Out of the 35 cases which showed presence of spirochaetes 10 were undergoing treatment for amoebic dysentery.

Measurements were made of 100 spirochaetes chosen at random from various stained preparations, the method of STEPHENS being used. The magnification employed was about 1,400 diameters. They varied from 2 to 8μ in length, but a single specimen measured 13μ . "This latter bore every appearance of being a dividing individual; it was partly incurved and showed a distinct thinning at the middle and suggests an explanation for the presence of a flagellum-like body seen at one extremity of two individuals."

The hypothesis is put forward that cases of intestinal amoebiasis which respond to treatment with salvarsan may do so on account of its effect upon lesions produced by associated spirochaetes.

E. J. W.

- i. LEGER (André) & CERTAIN. Recherche du Spirochète ictero-hémorragique chez les rats de Dakar.—*Bull. Soc. Path. Exot.* 1918. Jan. Vol. 11. No. 1. pp. 19-22.
- ii. LEGER (André). Spirochétose sanguine animale à Dakar. Sa valeur au point de vue épidémiologique.—*Ibid.* Feb. No. 2. pp. 64-66.

i. Sixty-seven specimens of *Mus alexandrinus*, 35 *Mus rattus*, and 18 *Mus decumanus* collected from the sewers and harbour of Dakar, were examined for the organism of spirochaetosis icterohaemorrhagica. The result was negative in all cases.

NICOLLE and BLANC working on similar lines at Tunis but with rats collected from the streets of the town had obtained the same results [this *Bulletin*, Vol. 10, p. 275]. Their inquiry suggested the research described in the paper under consideration.

The technique adopted was as follows: Small pieces of liver, spleen, kidney, and suprarenal capsule were macerated together in 5 cc. citrated physiological saline containing about 0.2 cc. of blood collected with antiseptic precautions. Of the resulting emulsion 1.5 cc. was injected into the peritoneal cavity and 3 cc. under the skin of a guinea-pig. On account of the scarcity of guinea-pigs it was not possible to use one per rat so the fragments of organs from (on an average) two to ten rats were pooled and the emulsion injected into two guinea-pigs, one intraperitoneally and the other subcutaneously. Thirty animals were thus inoculated. Their blood was examined at frequent intervals and post mortem examinations made in all cases, 8 being killed between the 13th and 18th day, and 22 between the 24th and 48th day.

The authors draw attention to the fact that in one *Mus decumanus* they found a spirochaete indistinguishable from *S. crociduræ* which has been described by one of them (Leger) as occurring in the shrew mouse [this *Bulletin*, List of References Special No., Sept. & Dec. 1917, Vol. 10, p. xix]. They emphasize this finding on account of the close resemblance of this spirochaete of sewer animals to that of human relapsing fever.

The writers do not conclude, on account of their negative results, that the rats of Dakar are free from infection, especially as examination of clinical records shows that an epidemic occurred in 1916 (anterior

to their arrival) among soldiers from camps near Dakar, of a disease which they hold was probably spirochaetosis ictero-haemorrhagica. Moreover they consider that their results may be due to seasonal incidence.

ii. A spirochaete, originally discovered by the author in a shrew mouse [see above], has been found by him in two *Mus decumanus* among a series of 500 animals examined. The result of experimental inoculation into various laboratory animals, together with consideration of its morphology, lead him to consider that the organism may be identical with that of human relapsing fever. He holds that his observations are of epidemiological importance in regard to the possible appearance of the disease in Senegal.

E. J. W.

NICOLLE (Charles) & LEBAILLY (Charles). i. **Recherches sur les maladies à spirochètes du rat transmissibles au cobaye.**—*Arch. Inst. Pasteur de Tunis*. 1918. Mar. Vol. 10. No. 3. pp. 125–137. With 2 charts.

— & —. ii. **Existence du spirochète de l'ictère infectieux, chez les rats des abattoirs de Tunis.**—*C. R. Soc. Biol.* 1918. Apr. 13. Vol. 81. No. 7. pp. 349–351.

— & —. iii. **Etude du virus ictérique naturel du Rat.**—*Ibid.* pp. 351–353.

— & —. iv. **Conservation latente du Spirochète de l'ictère infectieux, chez les rats et souris inoculés expérimentalement.**—*Ibid.* May 11. No. 9. pp. 469–471.

The second and third papers are summaries of the first. Continuing the investigations of NICOLLE and BLANC [this *Bulletin*, Vol. 10, p. 275] the authors examined 42 specimens of *Mus decumanus*, eight of which were collected from various streets in Tunis, and thirty-four from slaughter houses. The paper deals with the latter group only as the findings in the former were negative. NICOLLE and BLANC carried out their research in the winter (9 February–9 March) and considered that seasonal incidence might explain their negative results. The present investigation was therefore made in the autumn (25 September–3 December). It is noted that no human cases of infectious jaundice have been observed in Tunis.

Natural infection of rats as ascertained by inoculation of guinea-pigs. Of 21 inoculated intraperitoneally with a mixture of liver, spleen and kidney pulp from a rat, 4 died of infective jaundice. The same results were obtained with two, out of three inoculated with the pooled organs of thirteen rats. Nine to twelve days elapsed between inoculation and death. Icterus, in the positive cases, appeared about two days before death. No abnormal appearances were noted in the rats which were found to be infected.

Microscopic examination of tissues of naturally infected rats. Before inoculation of guinea-pigs the material was subjected to microscopic scrutiny, particularly the kidney pulp. In two cases only were the findings positive. In the one case the inoculation was with negative result in two guinea pigs, though spirochaetes had been seen in large numbers in the kidney tissue injected. Both animals developed a pyrexia lasting 3–4 days only. In the second case one of the guinea-pigs inoculated with a mixture of liver, spleen and kidney died with

all the signs of infective jaundice while the second animal which had been infected with kidney only developed merely a transient pyrexia. Two of the surviving guinea-pigs were later inoculated from a guinea-pig which had died of the inoculation. The result was negative and the first inoculation from the rat is presumed to have produced immunity. The authors conclude that proof of infection must not be based only upon the death of the animal but may be obtained by observation of the temperature.

Experiments with other species. Guinea-pigs were inoculated with liver, spleen, and kidney pulp from *Mus alexandrinus*, *Mus musculus*, and *Vespertilio kühli* (bat) with a view to determining the presence of the spirochaete of infective jaundice. The results were negative.

Conservation of the virus. The virus of rat spirochaetosis has been passed through 23 successive guinea-pigs. Spirochaetes are found in the blood and various organs of the animal. Positive results have been obtained by inoculation of blood and of emulsions of spleen, liver and kidney. Peritoneal and subcutaneous injections yielded analogous results. Guinea-pigs had been found to be infective from the first day of pyrexia up to 36 hours after death (body kept at $+15^{\circ}$).

Just as inoculation of a guinea-pig from an infective rat occasionally results in the immunisation of the animal so the same may occur when the virus is passed from one guinea-pig to another. The number of animals which survive decreases with the number of passages. The resistance of the animal is dependent on the dose, its nature, and the time in the course of the disease when the material is collected. The blood is the most virulent material; it decreases in activity with the increase of icterus. It is best collected at the time this makes its appearance.

Emulsions of organs for injection should be thick. Not less than 3 cc. should be used. When blood is injected 0.5 cc. is sufficient. Tissues kept in the ice-chest preserved their virulence for 4 days.

The experimental disease produced by inoculation of one guinea-pig from another. The virulence of the organism as evidenced by shortening of the incubation period from 4 days to 2, and at times to 24 hours, increases with the number of subinoculations. The chief symptoms are fever, icterus and haemorrhages. Pyrexia is the first of these to appear. The rise of temperature is rapid. It remains elevated usually for two days, on the third day falls to normal, and on the fourth falls progressively and rapidly until death ensues, usually in a few hours or, at most, a day. The authors emphasize the importance of taking the temperature with a specially constructed thermometer which can be inserted 7-8 centimetres into the large intestine.

Jaundice begins with the fall of temperature; it is first seen in the ears, nose and paws. Later it becomes generalized and the urine is affected. Haemorrhages are seen externally as a slight oozing at the various orifices of the body. They precede jaundice in the course of the disease. Other symptoms which develop later with the fall of temperature are restlessness, immobility, roughness of the hair and marked dyspnoea. There is no diarrhoea. The animal loses about one tenth of its weight in the course of the disease.

Post mortem examination: (i) intense jaundice of all the viscera, blood and urine; (ii) enlargement of lymphatic glands, chiefly inguinal

and axillary; (iii) haemorrhages in and around the glands, in the lungs, and under the capsule of, and around, the kidneys; (iv) no effusion into the serous cavities; (v) spleen slightly enlarged and softened; (vi) no macroscopic lesions in the salivary glands.

Other inoculations. Experimental infection (from guinea-pigs) of grey rats and mice, a black rat, a dog, a cat, and a horse were negative.

Experiments were made to determine the length of time for which *Mus decumanus*, *Mus alexandrinus*, and *Mus musculus*, artificially inoculated with the virus of infectious jaundice would remain infective. The animals, though developing no symptoms, were found by injection of a mixture of crushed viscera (liver, spleen, kidneys, suprarenals) into guinea-pigs to remain infective as follows:

3 *Mus decumanus*—5, 27 and 69 days.

1 *Mus alexandrinus*—102 days.

1 *Mus musculus*—6 days.

It is noted that similar experiments carried out with dogs and cats were negative at the time of writing.

E. J. W.

LHÉRITIER (A.). *Premières recherches sur les spirochètes des rats d'Alger.*—*Bull. Soc. Path. Exot.* 1918. May. Vol. 11. No. 5. pp. 357-359.

The incidence of spirochaetosis in rats (*Mus decumanus*) in the town of Algiers was investigated. In the south-eastern suburbs 3 per cent. in a series of 109 animals were found to be infected during the summer and 6 per cent. in a series of 50 in the winter. In the harbour during the winter 5 per cent. were found infected in a series of 50. The guinea-pig was the experimental animal used. The virulence of the organism was found to become attenuated by successive guinea-pig subinoculations. [This observation is at variance with that of NICOLLE and LEBAILLY in Tunis—see above.]

E. J. W.

NOGUCHI (Hideyo). i. *Morphological Characteristics and Nomenclature of Leptospira (Spirochaeta) icterohaemorrhagiae* (Inada and Ido).—*Jl. Experim. Med.* 1918. May. Vol. 27. No. 5. pp. 575-592. With 5 plates & 1 text-fig.

— ii. *The Survival of Leptospira (Spirochaeta) icterohaemorrhagiae in Nature; Observations concerning Microchemical Reactions and Intermediary Hosts.*—*Ibid.* pp. 609-625.

— iii. *Further Study on the Cultural Conditions of Leptospira (Spirochaeta) icterohaemorrhagiae.*—*Ibid.* pp. 593-608.

i. In an earlier paper [this *Bulletin*, Vol. 11, p. 205,] the author described some of the distinguishing features of *Spirochaeta icterohaemorrhagiae*. The morphological characteristics and nomenclature are now further discussed. It is pointed out that previous investigators have overlooked the true structure of the organism. The author considers that it must remain in a class by itself and he proposes the

independent generic name of *Leptospira* to denote the peculiar minute elementary spirals running throughout the body.

"The persistence of the . . . spirals at all times is a feature which distinguishes this organism from any treponema or spirochaeta. The depth of the spirals does not exceed the diameter of the body, a fact unknown among other so called spirochaetes. . . Unlike various spiro-nemata and treponemata, the spiral amplitude near the extremities is not noticeably less than that of the middle portion of the organism."

Attention is drawn to the remarkable flexibility of the "terminal or caudal" portion of the organism. In a free space "when one end is extended and straight and the other semi-circularly hooked, the organism usually progresses in the direction of the straight portion and seems to be propelled from the rear by the rotating hook. A specimen with both ends hooked remains stationary in spite of its rapid rotary motions. By straightening one end or the other alternately, the organism changes its progression from one direction to the opposite one. When the organism penetrates a soft medium, changing direction very rapidly, it seldom shows hooked ends. In this sort of movement the body assumes wide wavy undulations such as are seen in an active specimen of *Spirochaeta refringens*."

By way of comparison, a detailed account is given, illustrated by excellent microphotographs, of related genera (*Spirochaeta*, *Saprosira*, *Cristispira*, *Spirochaeta*, *Treponema*). It is proposed that, in describing a new spiral organism, it should, if not a *Leptospira*, be placed in one of these five classes. The salient features of these classes are shown in a diagram.

The spirochaetes found in American, European and Japanese wild rats are held undoubtedly to be strains of the same organism as that isolated from cases of infective jaundice on the British, French and Italian Fronts.

ii. Two lines of inquiry were followed in the investigation of the question of the survival of *Spirochaeta icterohaemorrhagiae* in nature: (i) "by following up directly the actual conditions to which the spirochaetes cast off by the hosts or artificially mixed with urine or faeces will have to submit; (ii) by mixing the spirochaetes with each in turn of the various bacteria commonly encountered in faeces, sewage, or soil, and then determining the results of their simultaneous existence in the same media." Numerous experiments were made on these lines, the result showing that the spirochaete survives for only a short time under natural conditions in intestinal contents, sewage, or soil.

With respect to microchemical reactions and intermediary hosts it was found that—

"*Leptospira icterohaemorrhagiae* is highly sensitive to the destructive action of bile, bile salts, and sodium oleate, but resists the action of saponin. In this last respect it differs from many so called spirochetes. The destructive action of these agents is counteracted by blood serum.

"The larvae and adults of the *Culex* mosquito, the larvae of the house-fly and bluebottle fly, wood ticks (*Dermacentor andersoni*), and leeches failed to become carriers of the spirochetes when fed on infected guinea-pigs or their organs; that is, they cannot play the part of an intermediary host of *Leptospira icterohaemorrhagiae*."

iii. In a previous paper [*loc. cit.*] the author described the media which he had found suitable for the culture of the organism. Three media are now recommended, which are modifications of these. For their exact composition the original paper must be consulted. Numerous cultural experiments, now described in detail, have also

been made by him with a view to ascertaining the relative nutrient value of various sera and other media and the influence of reaction, oxygen, diluents etc.

The presence of suitable animal or human serum is essential for the cultivation of *Leptospira icterohaemorrhagiae*. Its nutrient value is reduced by heating. The cultural value of different animal sera was found to vary considerably. Fresh or heated emulsions of organs of the normal guinea-pig or rabbit and the white and yolk of the hen's egg have no cultural value for the organism. "A luxuriant growth takes place in a medium of Ringer's solution to which more than 10 per cent. of normal rabbit serum is added." The tonicity of the culture medium has but little influence upon the growth and morphology of the organism, but its reaction should be slightly alkaline. *Leptospira icterohaemorrhagica* is an obligatory aerobe.

The addition of carbohydrates to media has no influence upon its growth or morphology. The optimum temperature for growth is 30–37° C. but the ability of the organism to multiply and remain active for a long time at 10° C. suggests that insects may act as reservoirs of the virus.

The experiments described were made with Asiatic, European, and American strains of the organism, no differences being detected between them

E. J. W

BOOK REVIEW.

CHANDLER (Asa C.) [M.S., Ph.D.]. *Animal Parasites and Human Disease*.—xiii + 570 pp. With 254 text-figs. 1918. New York: John Wiley & Sons, Inc., London: Chapman & Hall, Ltd.

This useful book does not profess to be either a work of reference for the specialist or a text-book for the academy, but has a wider and more exoteric mission. Its objects are to further the outlook of medical men and sanitary officials who wish to go beyond the ordinary routine, and to guide and perhaps to inspire teachers and learners in the various branches of applied biology that fall within the domain of "domestic science": also to give counsel and purpose to the observant traveller, and generally to enliven the imagination of an intelligent but inadvertent public. Such aims—though in his preface the author seems to be not entirely free from misgivings on this point—need no justification; for the well-informed compiler (if, as in the present instance, he have some philosophy in him and a gift of clear exposition) may be *poimen laon* if not *anar a dron*.

Beginning with a brief historical resumé and a few suggestive remarks on parasitism and the nature and meaning of the physiological reactions that parasites may evoke, the author passes in review all the parasites that afflict man, Protozoa, Spirochaetes (which are included among Protozoa rather for convenience than from conviction), Worms and Arthropods. Though specific parasites are not defined and described in meticulous detail, they are individually figured, their salient characters and the significant events of their several life-histories are outlined, and their pathogenic effects are discussed. Treatment and prevention are also considered, in some cases perhaps with more zeal than discretion; indeed in this particular the author often seems likely to carry one prospective class of his readers out of their depth while risking the confidence of his initiated clientèle. For, although the methods of abating and impeaching parasites and the general principles of insurance against infection are matters that cannot be too widely promulgated; yet such questions as the medical treatment of syphilis, malaria, dysentery, etc., where the imminent specific parasite is only one of many factors that engage the trained attention, do not come properly into the theme of Parasitism or even fall properly within the purview of the sanitarian.

Apart from this top-hammer the book is excellent, containing a large amount of information, well arranged and clearly and—not to speak it profanely—attractively expressed.

Of course in such an extensive survey there are bound to be some slight slips and some omissions. To instance briefly: the statements that the trypanosomes specific to mammals, in contrast to those specific to cold-blooded animals, are almost always pathogenic; that postero nucleate forms in subinoculations are diagnostic of the Rhodesian trypanosome; that quinine is "absolutely destructive to malaria parasites"; that malaria parasites can persist in hibernating mosquitoes in places where the mean temperature may fall considerably below 60° F.; that the virus of yellow fever is known "almost beyond doubt" to be a Protozoon; that emetin is destructive to parasitic amoebae in general; and that *Ornithodoros savignyi* is inactive in the daytime—these statements, though they may not very seriously mislead the reader whose comprehension does not go beyond general impressions, will hardly do for the exact student. The critical reader may also object on the one hand to the attention bestowed on the amoeba here described as *Craigia hominis* and the form of dysentery described as Craigiasis, and on the other hand to the omission of the very common *Entamoeba nana* and its cysts. But it would be ungracious to dwell upon these minor flaws in an excellent piece of work, though it is the invidious duty of the reviewer, who has to regard even the best performance "as 'twere with a defeated joy, in equal scale weighing delight and dole," to take note of them. The illustrations are copious, but the author has overlooked an obvious error in fig. 38 A.

A. Alcock.

TROPICAL DISEASES BUREAU.

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[No. 4.

APPLIED HYGIENE IN THE TROPICS.

By COLONEL W. G. KING, C.I.E., I.M.S. (Retired).

REPORTS.

KHARTOUM (1917).

The comparatively recent bringing of Khartoum within British influence and the efforts which have followed—notably under the advice of Col. BALFOUR—to sanitise this formerly unsavoury area lend special interest to the Annual Reports noting progress. That for 1917 shows that Dr. L. BOUSFIELD, the present Medical Officer of Health, consistently maintains progress. In his opening paragraph, he is able to show a mortality rate which many towns in Great Britain may well envy. In 1916, the total mortality rate was 16·5 per mille—that for 1917 was 12·8. These rates do not leave much room for dissection of vital statistics, even were the proportionate constitution of the population dealt with accurately known. Consequently, the text of the Report (as befits Preventive Medicine) is devoted to describing possible points of attack by disease, and measures adopted to frustrate them. This is less arresting to some minds than when reports are devoted to difficulties contended with *in the midst of epidemics*; but it is the rôle that brings satisfaction to the sanitarian.

Malaria. Thus malaria had its opportunity in 1917 when the Nile rose higher than known for 25 years. Naturally, the flooded new ground led to the formation of an immense number of pools. Fortunately the river fell rapidly, so that these pools could be approached at an early stage. Synchronously with the fall, special measures were adopted by filling, draining, pumping and oiling to render them unfit for mosquito breeding. The results of these precautionary measures were satisfactory; for the increase of malaria incidence in the population beyond the preceding year was not more than 0·4 per 1,000. Of a total of 707 cases, 160 only were considered by Dr. BOUSFIELD to have been acquired locally. Even this small number he conceives was due to the adventitious circumstance of the arrival of a mosquito infested boat from a malarious area, with

a cargo of wood, which had evaded treatment for infestation at a point on the approach to Khartoum, where this process is attempted by means of non-poisonous smoke. Dr. BOUSFIELD considers that to this boat must be assigned the blame of carrying infected mosquitoes which were borne by wind to the habitations yielding the victims to malaria. This theory he illustrates by means of the diagram which is reproduced in this Number.

[In pre-Ross days when it was believed that the "malaria germ" was conveyable by air, it was always possible to demonstrate in localities adjoining malarious areas that malaria was diverted by topographical features.]

Smallpox. Sixteen cases with five deaths occurred between March 6th and June 17th of 1917. The first case was imported in the person of a servant of an officer arriving from Egypt. The contacts were sedulously traced; but securing the first indigenous case presented difficulty. This "missing link" had departed to a neighbouring village, and was discovered walking about with most of the scabs off but "many still adherent." To meet such conditions general vaccination throughout the three towns and adjoining villages was carried out. In this campaign 68,241 vaccinations were effected, "so that 82 per cent. of the total population has been vaccinated or re-vaccinated." To facilitate vaccination some of the older pupils of Gordon College were trained. They then conducted vaccination under supervision. Dr. BOUSFIELD suggests:—"In the future this knowledge may be very useful as they will be scattered throughout the Sudan as native schoolmasters." Finally, he states:—"There can be little doubt that a serious epidemic was averted mainly by the energy with which all those responsible attacked the situation, especially as seven out of the sixteen cases did not report sick, but were discovered by the sanitary authorities."

Venereal disease. 7 per cent. of the Egyptian Army suffered from venereal diseases and the British 10.5 per cent. The rate in the previous year was 25 per cent. Dr. BOUSFIELD believes that although prophylactic measures were arranged for "it is possible that bringing the subject to the fore" acted as a warning.

Cerebro-spinal fever. The continued existence of this disease within the Khartoum area is necessarily a source of anxiety. In the Annual Report for 1916, measures taken to trace carriers were described. In 1917, only 5 cases occurred against 23 in 1916, and 102 in 1915.

RANGOON PORT (1917).

The Annual Report for 1917 by Dr. F. A. Foy, Port Health Officer, Rangoon (which is the second largest Port in the East) is remarkable for work performed under difficult circumstances. In forwarding his Report to the Government of Burma, the Sanitary Commissioner (Lt.-Col. C. E. WILLIAMS, I.M.S.) shows how feebly action is supported by legal enactments, which trust to the Masters of vessels making declarations of infectious diseases before entry to Port. He points to the fact that of 34 cases of cholera only 31, and of 47 cases of small pox, only 13 were reported. Under the Epidemic Diseases Act, Masters are subject to certain penal clauses which, however "continued in abeyance during the year under review, in conformity

with the Standing Order of Government." In consequence, the Port Health Officer finds his most effective aid is the local Vaccination Act of 1909, which requires that all deck passengers shall be protected against small pox, and therefore necessitates inspection of individuals.

Dr. Foy and staff examined vessels carrying 43,483 members of crew, and 206,186 passengers. He states that a total of 130 cases of infectious diseases were "reported and detected (including 47 of cholera and 47 of small pox) so that practically 130 foci of active disease were segregated or otherwise dealt with. . . . Of the 89 unreported cases landed here, 8 were detected by this Department at disembarkation, 8 at observation, 61 at inspection, 3 *developed in hospital*, and 2 *were said to have developed in town* and 1 was reported to this Department on boarding. Of the 89 cases *one was plague*, 15 were cholera, 34 small pox, 16 chicken pox, 10 measles and 5 mumps, all unreported cases on board on arrival that would have got into Rangoon."

Dr. Foy makes the following apposite remark :—

"*Segregation can only be imposed against vessels which arrive plague infected. But many vessels which arrive highly infected with cholera should have their passengers segregated for even a few days. The 14 cases of cholera were most of them detected during disinfection of effects of the passengers, when one after another fell ill while awaiting disinfection, while they might easily have passed in an inspection without disinfection.*"

In the matter of plague, Dr. Foy reports that "no vessels arrived from Indian or Foreign Ports infected with plague or (with) a history of rat mortality." During inspection of outgoing vessels, 22 cases of inflamed and enlarged glands were detected, but none of these was found to harbour plague bacilli; 17 outgoing vessels were at the Shipping Agents' request fumigated. One of these vessels for an Indian Port yielded 593 dead rats.

PANAMA CANAL (1917).

The Annual Report of the Health Department of the Panama Canal for 1917 (Chief Health Officer, Col. Albert E. TRUBY, U.S. Army) shows that administration has been complicated by the necessity of releasing several medical officers of the U.S. Army, and placing in lieu of them civilian physicians. Radical changes of this description are apt to upset administrative machinery, as has been found to be the case both in India and the Colonies; but Col. TRUBY testifies to the efforts of the newly appointed men to meet the requirements of tropical sanitation, of which necessarily they had no former cognisance.

The honour of being the particular "jumping off place" of plague and yellow fever remained with Guayaquil. Yellow fever being regarded as endemic in the Venezuela Ports the shipping thence was specially watched. In Brazil and "some of the West India Islands" this disease was reported to exist; it was also credited with "considerable prevalence in Mexican ports, particularly in the vicinity of the Yucatan Peninsula." As to plague, "conditions were bad" and were attended with a huge mortality rate; but as to yellow fever there was the saving grace that the seasonal increase "has not been as extensive as expected." In Peru and Chile, plague is recorded as generally disseminated. This disease was reported as existing in Brazil, and there was reason to "suspect" its presence in Venezuela Ports.

It will therefore be seen that the Chief Health Officer, Panama, has not only to contend with the shifting conditions of canal construction which affect malaria possibilities, and those attending a large fluctuating population, but has to deal with the ever constant danger of invasion of plague or yellow fever from undeclared or suspected sources in close proximity to the canal. Of the efficacy of the vigilance exercised, there is proof in the statement that "no cases of yellow fever or bubonic plague have occurred in the Isthmus during the year 1917. The last case of yellow fever occurred in November, 1905, and the last case brought to the Isthmus was on December 10, 1915. The last case of bubonic plague contracted on the Isthmus occurred in August, 1905."

The total employees of all classes during 1917 was 32,589. The constantly non-effective rate from all causes was 9.65. For malaria, this rate was 0.48 as compared with 0.59 for 1916 and 1.19 for 1915. The death-rate for disease alone was 5.74.

The Report includes diagrams showing that the death rate from malarial fever for the entire population in the Canal Zone and cities of Panama and Colon, including employees and non-employees, has progressively declined, as exhibited in the following table (p. 45):—

Year.	Population.	Rate.
1906	73,264	9.49
1908	120,097	3.36
1911	156,936	1.82
1914	123,592	1.27
1915	121,650	0.51
1916	116,918	0.21
1917	114,003	0.18

DISEASE PREVENTION.

MALARIA.

Cyprus.

The Annual Medical Report, for 1917, by Dr. R. A. CLEVELAND, Chief Medical Officer, Cyprus, records the continued success of the anti-malaria measures inaugurated during the visit of Sir Ronald Ross to the island in 1913. According to the returns furnished by Medical Officers, 10,035 cases of malarial fevers were treated in 1912; in the subsequent years, up to and including that under Report, the figures per annum were respectively—7,342; 6,622; 4,539; 3,752; 2,709.

During the year, 35,460 children were examined for spleen enlargement; "of these, 33,317 presented no signs of enlargement of the organ, 1,888 showed slight enlargement, 218 medium enlargement, and 37 had what may be called big spleens." In 1913, the spleen rate was 17.2, in the succeeding years up to and including 1917, the rate was respectively 15.3; 11.5; 7.6; 6.0.

During 1917, 729,414 feet of drains and streams were "cleaned and improved," 58,138 ft. of small and 11,977 ft. of large drains were made, 697 pools were filled in at (a cost of 60,290 c. ft. of material), and 4,932 of these were drained. In addition clearance, by cutting, of grass over an area of 54,334 sq. ft. was accomplished. Many pools were also pumped dry; 478 tanks were stocked with gold fish. Finally, Dr. CLEVELAND states that, as a result of drains constructed during 1917 and the preceding year, 1,750 'donoums' have been reclaimed, of which 500 are already under cultivation; "of the remainder, part will, in course of time, be brought under cultivation—that remaining uncultivable being used as grazing land."

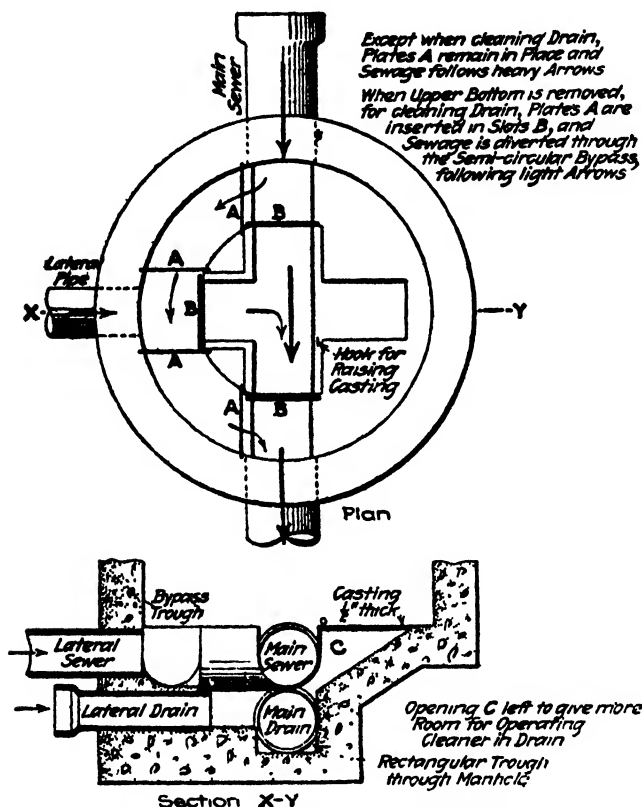
Dr. CLEVELAND requires it to be remembered, as illustrating the meaning of the data above quoted, that, in 1878, troops were withdrawn from the Island which had proved "a hot-bed of malaria." During the war, however, both troops and prisoners have been quartered there; yet no primary cases of malaria infection have occurred amongst the prisoners, whilst the incidence rate of malaria per cent. amongst the troops has already been only 0.4. [To those who have but a halting belief in radical measures against malaria owing to contentious objections, founded chiefly on fanciful estimates of necessary monetary outlay, it should be of interest to know that the total cost of all anti-malaria measures throughout the Island, during 1917, "including drugs, salaries, &c." was only £2,700.]

Irrigation and Drainage.

An illustration of the manner in which the subsoil water level (to the detriment of the population and agriculture) is liable to be affected by uncontrolled irrigation is afforded by the city of Richfield, Utah (*Engineering News Record*, New York, June 26, 1918). Here, the rainfall is only 8 inches per annum. "The soil and subsoil to a considerable depth range from a fine sandy loam to a tough clay. . . . The city is on ground within an inter-mountain valley, with a fall

of 2 to .02 ft. per 100 ft.—the least slope in the city being about 1 ft. per 100 ft.” The result of what must have been excessive irrigation is thus stated:—

“As is common in most irrigated regions, considerable areas, progressing from the lower portions upward, became waterlogged, until practically all the land between the city and the river was unfit for cultivating crops, and was devoted to wild hay meadows and pasturage. The water table within the city rose steadily until over the lower portions it reached the surface of the ground. On the principal business street of the city practically all the cellars and basements have been flooded.”



Plan and Section of Manhole at Richfield, Utah.

In the effort to combat these conditions, the city has adopted a sewerage system that rejects all storm water, which is so small that sufficient run off is provided by existing ditches. It attempts also to reject subsoil water as far as feasible, by the use of oakum and cement made sewer joints—which was rendered desirable on account of selection of the septic tank process for sewage disposal. But to deal with the subsoil water in the sewer line trench, special subsoil drains are laid. Both the sewer pipe and the subsoil pipe are salt-glazed. But the latter

“was laid with open joints, care being exercised not to butt the ends too closely, to prevent sediment from sealing the joints and preventing free entry of water. Around each joint of the drain, coarse, clean gravel

was deposited, the amount depending on the nature of the material encountered at grade. Gravel containing a considerable amount of small particles or sand is not suitable for filling around bell-end joints. The fine particles, together with mud, make a practically water-tight joint. When coarse gravel is used more mud enters the joints, to start with, but the tendency to seal up is lessened very much or prevented altogether. Sometimes the trench was filled with gravel all along the drain, completely covering it. Otherwise, dry earth in small lumps was spaded around the drain, covering it, to form a cushion on which the sewer was laid."

Nothing is said by the Engineer responsible for the scheme (H. S. KLEINSCHMIDT) as to measures against the prime cause of the city's trouble—over irrigation; as, presumably, he dealt with solely the sewerage and drainage scheme; but the manhole arrangements securing access to the subsoil drain are of so unusual a character that they are reproduced.

Reclamation.

Hitherto, during the stress of war, improvements in dwellings and sites occupied by troops, water supplies,* and especially roads in occupied countries have been frequent as military necessities, but the undertaking of an anti-malaria scheme involving drainage and reclamation of huge marshy tracts of a country has been reserved for the Entente in Greece. According to the "Times" of the 11th July, the drainage of marshes in the Struma Valley will be undertaken by a British group of Engineers, and in the Vardar Valley by a French group. If these works fulfil the object of rendering these valleys no longer notorious for malaria, the Greek agriculturist will have, in after years, some reason to remember with gratitude the advent of the Entente armies.

Water Edge Breeding.

In the U.S. Public Health Service Weekly Report of the 19th April, Asst. Surgeon General H. R. CARTER gives evidence to show that it is a mistake in dealing with large masses of water to rely upon mosquitoes breeding only in the immediate vicinity of the banks.† In a camp in an area where there was no water not in control within a mile, he found 442 mosquitoes within one third mile of the Chappa-wampsic Creek. He ascertained that heavy breeding of the *A. quadrimaculatus* occurred in the advantageous conditions attending the growth of acres in extent of wild celery (*Vallisneria spiralis*). This plant was growing in water varying from 2½ to 6 feet deep. Within 300 feet of the shore each "dipper" yielded an average of eight larvae and, in one instance, 52 were obtained. "In addition to the breeding in this 'floatage,' there was breeding in some of the lotus beds, where the leaves of this plant fell into the water and adhered together as they decayed. *Where the leaf stood up above the water there was no breeding.*" [Italics not in the original.]

The Water Hyacinth.

This plant (*Eichornia crassipes*), although highly ornamental, has not only the demerit of affording in the tangled mass shelter for the

* Jerusalem has recently benefited by the introduction of a water supply by British Engineers.

† See also Vol. 11, No. 5 (Sanitation Number), May 15, 1918, p. 376.

breeding of mosquitoes, but of becoming a serious obstacle in canals employed for irrigation or navigation. Thus, the "Madras Mail," of July 30, 1917, reported that Major HORNE, I.M.S. (Officer deputed for anti-malaria duty) holds that it affords excellent breeding facilities for the *A. Listoni*, and ascribes a sudden outbreak of malaria in the town of Chingleput, Madras Presidency, to the introduction and rapid excessive growth of this plant, in the local fort moat. Again, "The Indian Engineer" (Calcutta) of March 2, 1918, states that this weed gave such indications of rapid growth in the Pegu-Sittang canal, that it became necessary to attempt to bar the floating mass by means of a wire fence. This measure however proved inefficient, as the mass burst through and for some time choked the canal, till systematic methods of removal were employed. In Bengal, Florida, Java and Australia, this weed has also proved a source of trouble and expense to public authorities.

Much the same problem confronts Col. TRUBY, Medical Corps U.S. Army who, as Chief Medical Officer Health Department, Panama Canal, animadvertes upon the *Pistia stratiotes* as a source of shelter for the *Mansonia titillans* when adopting its usual U-boat tactics. In his Annual Report for 1917, he states that the whole subject of its mode of development and propagation and suggestions for its control are being investigated; and also that "additional studies on the water lettuce will be carried on from time to time, with the view of discovering an economical and practical method of eradicating the plant and its associated mosquito." The *Pistia stratiotes* and the *Eichornia crassipes* have much in common both in chemical composition (according to the Agricultural Research Institute, Pusa) and habits.

So far as Bengal is concerned, the Agricultural Research Institute at Pusa, India, has again shown how closely the interests of Agriculture, Hygiene and Economics are allied. Various schemes for putting the water-hyacinth to industrial use have been excogitated, but that propounded by Mr. HOWARD, C.I.E. (Agricultural Journal of India, April, 1918) of utilizing the plant as a source of potash has already proved of commercial value. The chemical composition per cent. of the dried plants is as follows:—Potash (K_2O), 28.7; Soda (Na_2O), 1.8; Lime (CaO), 2.8; Chlorine, 21.8; Phosphoric Acid (P_2O_5), 7.0. He claims that whilst the plant is not so rich in potash as the best marine kelp, it on an average yields 25 per cent. and therefore approximates Laminaria at 26 per cent. It contains "about the same amount of nitrogen and phosphoric acid and perhaps rather more than ordinary farm yard manure" and is several times as rich in potash. When used in the form of ash after burning, it may contain 35 per cent. and on an average 25 per cent. of potash. Experiments made with it show it to be of great value in aiding the cultivation of jute which is of great economic importance in Bengal. A Calcutta Agency has offered from Rs.84 to Rs.102 per ton of ash for utilization as a source of potash. [It is therefore possible, if cheap modes of collection be devised, that the commercial use of *Pistia* as a potash producer might be satisfactorily conducted in Panama.]

Larvicides.

From the Annual Report on Papua for 1916-17 it is evident that malaria causes no mean rate of sickness in Papua, but the area of

its prevalence is not ascertained. Papua is however provided with a readily obtainable light-giving wood that should serve as a lure in trapping mosquitoes, and a "resinous substance" wherewith they may be killed. The Lt. Governor (J. H. P. MURRAY) states (p. 46):

"These people have a rough sort of lamp made of stone generally, but sometimes of wood, hollowed out in the centre to receive a resinous substance which gives the light. The lamp is called *nakeo*, and the resinous substance *gagaba*. *Gagaba* gives a good light, but it burns too quickly. The smell is pleasant, and has the gratifying effect of driving away mosquitoes, which, of course, swarm by myriads in this country of swamps."

Anophelines.

Col. A. E. TRUBY* announces the identification of a mosquito hitherto unreported in the Canal Zone. "The *Anopheles hylephilus*, the larvae of which undoubtedly live in the water held at the bases of the leaves of Bromeliaceous plants." Studies as to the habits of the *Mansonia titillans* and the plant it favours, the *Pistia stratiotes* or water lettuce, were continued under that officer's direction during 1917.

Anopheline Malaria Bearers.

H. R. CARTER, Asst. Surgeon General, U.S. Army, after producing evidence that although the *A. punctipennis* is capable of conveying malaria in nature it is a factor of little importance, states this cannot be said of the *A. quadrimaculatus* and *A. crucians*.† He therefore gives the following opinions:—

"To what extent each of the three species of *Anopheles* most common east of the Rocky Mountains, *A. quadrimaculatus*, *A. crucians* and *A. punctipennis*, is a factor in the natural conveyance of malaria is possibly the most important of our field problems. . . . Over the whole United States the cost of these and other measures for controlling *punctipennis* would run into many millions each year, which should not be expended if the malaria averted by them—for *punctipennis* unquestionably does convey some malaria—causes less loss than would the expense of averting it. To spend a dollar in sanitation and get less than one hundred cents' benefit is not only bad business, but bad sanitation."

Quinine Prophylaxis or Mosquito Reduction.

The following table, according to the Philippine Health Service Annual Report for 1916, furnishes a very significant demonstration of the value of the anti-mosquito campaign in the reduction of the prevalence of malaria in the city of Manila (p. 73):—

<i>Quinine period.</i>			<i>Anti-Mosquito period.</i>		
Years.		Deaths.	Years.		Deaths.
1901	..	310	1910	..	122
1902	..	352	1911	..	103
1903	..	262	1912	..	91
1904	..	166	1913	..	75
1905	..	177	1914	..	53
1906	..	220	1915	..	51
1907	..	164	1916	..	56
1908	..	177			
1909	..	118			

* Report of the Health Department of the Panama Canal for the Calendar Year 1917. 1918. Washington.

† Public Health Reports, 1918. Apr. 19. Vol. 33. No. 16. p. 575.

TRYPANOSOMIASIS.

The Medical and Sanitary Administration of Uganda was handicapped, during 1916, by the deputing of Medical Officers in civil employment to military duty. Nevertheless, the organization against Sleeping Sickness continued its labours successfully. In the Medical and Sanitary Report of the Protectorate for that year, the Medical Sanitary Officer (Dr. C. J. BAKER) quotes figures (p. 8) showing progress in extirpation of this disease. In 1905, in Buganda, the deaths from this cause were 8,003, in 1909 they were 925, and in 1914, 24 were recorded; in 1916, only two deaths were placed against Buganda. In the other areas of the country, steady diminution of incidence has occurred; so that the total for the Protectorate in 1916 was only 209—a distinct sanitary success.

SMALLPOX.

Preserved Vaccines.

The following results of employment of various anti-small-pox vaccines in the Uganda Protectorate are reported in the Annual Medical and Sanitary Report for 1916* :—

Table of Vaccinations (Military and Civil).

Lymph.	Successful.	Modified.	Failed.	Unknown.	Totals.	Number of known resul s.	Percentage of successful (plus modified).
Lister dry ..	722	—	362	904	1,988	1,084	66.60
Lister lanol. ..	242	95	32	538	907	369	91.32
Nairobi glycer.	8,397	918	4,520	35,784	49,619	13,835	67.32
Arm to arm ..	599	—	168	1,405	2,172	767	78.09
Totals ..	9,960	1,013	5,082	38,631	54,686	16,055	68.34

Total of military vaccinations for 1916 is 24,065.

It will be seen that lanolinated vaccine as supplied by the Lister Institute gave the best results, notwithstanding its distant transport. The low percentage obtained with “dry” vaccine from the same Institute is stated to be “chiefly due to the complete failure of one batch of lymph which may be accounted for by delay in transit.” Of vaccine made locally at Nairobi, irrespective of its poor success rate, the Report states that doubts have been expressed by certain medical officers as to its immunizing powers.

* Uganda Protectorate. Annual Medical and Sanitary Report for the Year ended 31st December, 1916. 1917. Entebbe: Government Printer, p. 15.

Subcutaneous Vaccination.

Lt.-Col. FEARNSIDE, I.M.S., District Medical and Sanitary Officer, Coimbatore District, Madras, aided by Sub. Asst. Surgeon S. Gopal Poi (*Indian Medical Gazette*, April, 1918, Vol. 53, No. 4, p. 140) has excogitated a method of vaccination to overcome difficulties arising from opposition by physical means to vaccination. In their Notes on the subject, the authors state that the District of Coimbatore has long been notorious for poor vaccination results, both amongst the civil population and prisoners. They ascertained that it was a common custom to remove the vaccine from scarified surfaces. The lanolized vaccine in use was received by post in small leaden tubes with a cap having a standardised thread. To a spare cap was soldered an ordinary hypodermic needle which was carefully sterilized. After preparing the skin the vaccine was inserted subcutaneously at the usual sites. There resulted "the usual focal reaction lasting the usual time, but no vesiculation except where the needle has scratched the surface of the skin." The success rate was raised 14 per cent. under the test named. The authors state, "to prove that the method is successful, we vaccinated 12 persons who had been inoculated with the vaccine by injection; by the ordinary method of scarification all were negative, which proves that this method is quite protective. Its main advantage is that the lymph cannot be rubbed off. In leaving no marks it is impossible to tell whether a person has been vaccinated or not—a boon to ladies who abhor the vaccination marks on their arms; and it is a cleaner and more rapid method of manipulation." They advise trial of the method by those interested, but, in the meantime, consider the mode sufficiently useful for themselves to continue it.

The Buffalo as Vaccinifer.

* Vaccination against smallpox was introduced into Java in 1803 during the French occupation by GAUFFRÉ, a French surgeon-major, who sent 8 children by ship to Mauritius to be vaccinated there and then brought back. With the supply of human vaccine thus obtained, arm-to-arm vaccination was begun in Batavia. In 1807, a fresh supply of vaccine was obtained from Mauritius in the same way by the Dutch authorities. In 1856, Java and Madoera were systematically subdivided into 166 vaccination districts, each containing from 100,000 to 350,000 inhabitants to each of which a public vaccinator, usually a native, was appointed. The rule is, if possible, to vaccinate each individual 3 times during life; at 6 months old, again at 12 years, and a third time at 20 years. Unfortunately, it has never been possible to make vaccination compulsory among the native population. The population of Java and Madoera being about 40 millions, the attempt is made to vaccinate 4 millions of persons a year. During the last few years, human vaccine has been completely replaced by calf vaccine, and the government vaccine establishment now manages to turn out 8 million doses of vaccine a year. This enormous quantity of vaccine is obtained by employing young buffaloes

* WINCKEL (Ch. W. F.). *Pokkenbestrijding in Nederlandsch-Indië*. [*Small-Pox Prevention in the Dutch Indies*.]—*Tijdschr. v. Sociale Hygiëne*. Vol. 19. No. 7. 16 pp. [Summarised by Dr. J. B. NIAS.]

instead of calves for the production of vaccine, 62 buffaloes yielding as much vaccine as 1,500 calves, the average yield per buffalo being 248 grammes of pulp. As vaccination from buffalo to buffalo is found to deteriorate the vaccine,* the strength is kept up by periodical passage through rabbits and calves. The vaccine is depurated with glycerine at room temperature (26° C.) and the process takes place much quicker than in cold climates. It is sent out in sealed capillary tubes in the concentrated form to the vaccinators, who then dilute it to the required strength immediately before use. The author states that by this arrangement the virulence is better preserved.* In outlying portions of the Dutch Indies, where the population is much more scanty, and the difficulties of travel much greater, the arrangements for public vaccination are necessarily much less complete. The time of the public vaccinator, who is always a native and not usually a medical practitioner, cannot be fully employed at his official work and the question is under consideration at the present time of making such officials assistants to the local medical men for cognate sanitary duties, as for example malaria prevention.

ANKYLOSTOMIASIS.

The Annual Medical Report (1917) for Seychelles shows that, under Dr. J. F. KENDRICK, the International Health Commission has completed the treatment of Mahé. with the result of its being ascertained that 90 per cent. of the population were sufferers from ankylostomiasis. "During the year a Law was passed enforcing the provision of latrines for all inhabited premises and forbidding the deposit of excreta in any other places than latrines."

Dr. J. BRADLEY, Asst. Medical Officer, South Mahé, reports that "it is a pleasure to see how quickly the population has responded to correct and scientific treatment, and this remark applies specially to the juvenile members of the community; their fresh healthy faces are in marked contrast to their former dull pallid and lethargic appearance."

In an estimated population of 4,800, South Mahé yielded a birth rate of 31·6 and a death rate of 15·2 per mille.

BILHARZIASIS.

An excellent instance of the parasitologist solving a sanitary problem is afforded by Dr. LEIPER in his Report of the Bilharzia Mission in Egypt (1915), as recorded in the *Journal of the Royal Army Medical Corps* [March 1918, Vol. 30, No. 3, p. 244.] In the village of Marg urinary bilharziasis persisted to the extent of 90 per cent. amongst the children, but incidence of the intestinal form could not be gauged. He found in "the small canal within the village *P. boissyi* was relatively more frequently infected with cercariae, i.e., with *B. mansoni* than was *Bullinus* with *B. haematobia*." Dr. LEIPER sought for an explanation that was not to be ascertained in the laboratory. The

*[That the yield of vesicle pulp is greater with buffalo calves than with other bovines is (*ceteris paribus* as to age and size) a usual experience; but that during successive transmissions vaccine undergoes degeneration solely because the soil is afforded by the buffalo, and that virulence is "better preserved" in the manner indicated by the author, would demand full experimental and statistical evidence for unreserved acceptance.]
—W. G. K.

banks of the canal were shelving, and were used by the villagers for defaecation. In squatting, they faced the upward slope of the bank, so that the urine was discharged in the "dry surface at a higher level than that at which the stool was deposited"; with the result that the urine sinks into the dry soil leaving the eggs "exposed to the destructive effect of sun and wind." As to the eggs passed with the faeces, their chances of survival unhatched even for weeks under suitable conditions in fairly consistent stools would be good. Dr. LEIPER ascertained that the level of the water varied in accordance with the amount passed for irrigation purposes

"with the consequence that the sides of the canal and especially the flatter portions of the bed are automatically and periodically washed.

"The bulk of the lateral-spined eggs will be set free and will rapidly hatch in the immediate vicinity of the proper intermediary *P. boissyi*. The terminal-spined eggs which hatch are only those that have been passed in the faeces, and to this limited extent the *Bullinus* snails will become infected. Within the village the stream is too shallow for bathing. In the summer the children proceed higher upstream and to the parent canal where *Bullinus* is unaccompanied by *P. boissyi*. It does not necessarily follow, therefore, that the incidence of bilharzial dysentery and haematuria due to *B. mansoni* and *B. haematobia* respectively should correspond to the incidence of infection in the respective intermediary hosts within the village. Unfiltered water for all uses is taken from this stream into every house in Marg, so that the chances of infection within the home seem very great, both from the use of the water for drinking and for washing. Practically nothing appears to be known of the prevalence of intestinal bilharziosis, especially among women."

PELLAGRA.

In the Report on Charitable Institutions in Antigua, for 1917, Dr. J. C. McPHERSON invites attention to the increasing prevalence of pellagra in the Island. He shows that whilst in 1916 eleven cases were recorded at the hospital, in 1917 twenty cases were under treatment. At the Central Lunatic Asylum in an average daily population of 164 inmates, "there was an increase in the numbers of lunatics suffering from pellagra—seven deaths during the year being attributed to this cause." He considers there is reason to suspect that "in the asylum and its vicinity an infective agent is present which causes pellagra, one or two cases having been recently discovered at Clare Hall to the north of the asylum ground, and the increase in the disease can hardly be accounted for by food deficiency alone. . . ." Against the diet theory, he advances the fact that the diet scale has been "the same for about ten years," that "many of the pellagrins do not appear to have had the disease before or at the time of admission," and that the "injection of Soamin grs. 3 every third day has appeared to be of decided benefit." He adds that "acting on the food deficiency theory a more liberal dietary scale has been adopted" and its effects will be watched. [The prices of food articles as in most places in the world have increased in the West Indies. In the Asylum in the presence of a fixed scale this would not have been operative, unless unavoidable decline of quality or sanctioned substitution for not readily obtainable articles occurred. On the other hand, the absence of details of diet, of prior history of individuals and of the respective duration of their residence in the Asylum prohibits conclusions. In the meantime, Dr. McPherson has the material for useful observation before him for further reports.]

PLAGUE.

The Medical and Sanitary Report of the Uganda Protectorate for 1916 shows that according to native returns (and returns by native inspectors in the Eastern Province) deaths from plague were 4,384 against 3,100 in 1912. Small epidemics occurred in Kampala, Jinja and Port Bell. In the last named, the first death occurred in a railway porter working in the goods sheds. Here, it was reported that "rats had been dying in large numbers . . . and *Bacillus pestis* were found in one of the rats examined." At Kampala, it was ascertained rats were dying in two granaries and also in the Bazaar. In the European residential quarters of Port Bell, infected rats were found but no human case followed. Similarly, it is reported, "though plague rats were continually found in the bazaar, cases there have been surprisingly few." In Port Bell 25 cases occurred, and in and around Kampala there were 213 recorded cases, with a total death rate of 90 per cent. Of the type of plague found the following statement is noteworthy (p. 39):—

"Unfortunately however in the third week in November a serious outbreak was discovered in the Soudanese village of Kololo, 1½ miles from the Bazaar. On investigation the infection was found to have been brought from the Bazaar on October 17th and that 7 fatal cases had occurred in the village which had not been reported and had been buried secretly. Of the 400 odd inhabitants of this Soudanese village, altogether 65 cases occurred up till December 8th, since when there has been no case. These cases were nearly all of the septicaemic type with 63 fatal."

At Kampala, no pneumonic plague was observed but "there was a large percentage of the septicaemic type,* which showed no buboes but in which in nearly all cases the diagnosis was confirmed microscopically by smears of blood or spleen smears." At Jinja, a few pneumonic cases were found. A native who assisted at the post-mortem of one of these was infected and died.

On the subject of the origin of the epidemic, Dr. BAKER records that both in his opinion and that of the Medical Health Officer, Kampala, "the infection was brought to Kampala from the endemic plague areas in the Eastern Provinces by means of infected rats in cargo on lake steamers." The actual medium of transport he assigns to seed cotton, and supports this evidence by the following data (p. 42):—

"(4). Both the ginneries which became infected at Kampala receive the bulk of their seed cotton from the Eastern Province and were the only two ginneries receiving cotton at the time.

"(5). Moreover when the cotton was being unloaded from carts in which it was brought from Port Bell, at one of these ginneries live rats were actually seen among the bags of cotton.

"(6). If it is possible for rats to find harbourage in seed cotton in moving carts they will do so in the lake steamers on Lake Chioga, the railway trucks between Namasagali and Jinja as well as in the steamers on Lake Victoria and in my opinion the rats have brought the infection from the endemic area round Lake Chioga in this manner."

Preventive measures were of the usual type, but special attention to supervision and regulation by "permit" of the cotton trade was exercised, under a recent law, "The Prevention of Diseases Cotton

* The predominance of this type of plague in certain epidemics or stages of epidemics merits special investigation.

and Other Trades Ordinance," 1916, which affords powers to restrict "the movement, handling and storing of produce, merchandize or cotton."*

CHOLERA.

In this *Bulletin* (Sanitation Number). Vol. 11, No. 5, May 15, 1918, p. 337, a reference was made to instances where bacteriological examinations may fail to identify a carrier of typhoid, owing to intermittent voidance of microbes. An account of search for cholera carriers in Bilibid Prison, Manila† shows that it is necessary when viewing results of stool examination for cholera to hold in mind the same possibility.

During an outbreak of cholera in the Prison in 1914, 32,000 cultures were made in the search throughout the convicts for carriers. These examinations revealed 128 carriers. Of these 5 per cent. exhibited "well defined symptoms of cholera at intervals varying from 1 to 18 days after the infection was found in their stools."

"In following up the cultures of cholera carriers it has been found that the carriers will give one or two positives and then a series of negatives to cultures taken every four days. In some cases anywhere from 20 to 35 successive negative stool cultures were obtained at two day intervals, the stool later becoming positive; indicating that the carrier is either a carrier intermittently or that the organism undergoes some changes in which we cannot at the present time recognise it as a cholera spirillum."

In 1916, in examinations of stools, which were conducted as a routine measure during 15 days quarantine of new arrivals, 600 or 8·2 per cent. of the convicts were proved to be carriers. The case of one convict is cited as of special interest:—

"Prisoner 10556 had been in prison since October 1914, at which time he was found to be a cholera carrier. This man later had six negatives in 1914. In 1916, he was admitted to the hospital suffering from amoebiasis, his stool being positive for amoeba in April, May, June and July. In September, it was found to be negative, and was negative for cholera vibrio on July 11 and August 25. On September 6, 1916, this man died. The pathological report returned by Dr. Crowell showed that the cholera vibrio had been found in the jejunum."

Identified carriers were subjected to the influence of ox gall—"the treatment of ox gall 0·65 t.i.d. for two days." Of 529 prisoners formerly identified as cholera carriers, 23 per cent. became repeaters on the average within ten days of ox gall treatment. Prior to its use of 185 cases 8 per cent. became repeaters within two months. Squads were set aside for observation of results of treatment with urotropine (10 grains t.i.d.) in the case of repeaters. Cultures were made thrice

* In this Report of 1913 on East Africa, Prof. W. J. SIMPSON, C.M.G., laid special stress on the necessity for guarding against importation of plague by means of dealing with the cotton industry.

† Government of the Philippine Islands. Department of Public Instruction. Philippine Health Service. Report of the Philippine Health Service for the Fiscal Year from January 1 to December 31, 1916. [J. D. LONG, M.D., Director of Health]. 1917. Manila: Bureau of Printing, pp. 25, 26 & 27.

weekly "for non-agglutinable, partially agglutinable and agglutinable vibrios." The results are thus recorded:—

Results.

Group.	Average.				Total to a next positive.
	Positive.	Negative.	N. A.*	P. A.†	
	Days.	Days.	Days.	Days.	Days.
First ..	5	9	17	22	53
Second ..	5	7	12	18	42
Third ..	5	7	12	19	43

* Nonagglutinable.

† Partial agglutinable.

BACILLARY DYSENTERY.

The Annual Report for 1917 by the Chief Medical Officer, Seychelles, contains a striking instance of introduction and transmission of bacillary dysentery. After stating that this type of the disease did not formerly exist in the Seychelles, he reports that as it was known that some cases of the disease had occurred amongst members of a Labour Corps which had been employed in the East Africa Campaign, he arranged that on their return they should pass a period in quarantine. One of these men however managed to conceal his condition, and on reaching his home trusted for his cure to "sorcery medicine." Here he was in contact with fifteen of his relations. These on returning to their own residences after the death of the original case were, without exception, attacked with the disease. These cases were duly secured, and no further spread of the disease occurred. The Chief Medical Officer reports that it is difficult to state why the infection was so virulent, and ascribes the spread of the disease to the somewhat indefinite agency of the "insanitary habits" of the people.

TRENCH FEVER.

The *Transactions of the Society of Tropical Medicine and Hygiene* for June 1918, Vol. 11, No. 7, contains an important paper giving in detail results obtained by the War Office Trench Fever Investigation Committee (Surgeon-General Sir David BRUCE, K.C.B., F.R.S., Chairman), which are confirmed by other authorities* on the subject, that trench fever is a louse-borne disease. The body-louse now stands convicted therefore of being the conveyor of typhus, relapsing fever and trench fever. Consequently, as an undesirable camp-follower in the midst of a world-war, measures for its control are essential. The significance of its wide distribution is thus stated by the authors (p. 260):—

* The Committee on Trench Fever (appointed by the American Red Cross Research Committee) assembled in France 1917-1918.

"While we are unable, in the present state of our knowledge, to state definitely that lice occur in every inhabited part of the world, it is probable that they do so. They are, however, undoubtedly less plentiful in hot than in cold climates. The known distribution of louse-borne disease, therefore, by no means corresponds to the distribution of lice. These diseases are diseases of cold rather than of hot climates, of mountainous rather than of low-lying countries, and prevail in winter rather than in summer."

[Such a definition might well lead to a more complete study in plague epidemiology of the rôle of insects other than the flea, upon which attention has been so largely concentrated. For instance, the question of the grade of septicaemia in human plague which would put the louse aside has been far too lightly handled. Roughly, plague as to climate, and especially as to season, must be said to follow the uneducated Indian's method of describing the difference in meteorological conditions of areas—according to the number of blankets necessary for an individual.]

In view of the importance of preventing spread of trench fever by getting rid of the now obvious agent of transference, the paper places stress upon the prevention of lousiness amongst embodied men.

In referring to methods of combating this condition,* the authors point to two matters that are likely to be overlooked in practice. They suggest that in the midst of lousiness, infection may occur more readily if scabies be present, seeing that skin abrasion favours receipt of the crushed faecal matter of the infected louse. Hence, the necessity of scrupulous attention to eradication of that disease as an auxiliary preventive measure in dealing with trench fever. In regard to lousiness, they lay stress upon the capability of the young louse to wander, and the consequent necessity for disinfection measures not being confined simply to the body and clothing but extended to the surroundings of infected men.

[In regard to scabies, this capability of wandering of young mites is of the same importance as in respect to the young louse. In March 1916, the writer referred this question to Mr. BACOT and he suggested, in the absence of exact information, that wandering was probable on the analogy of the Sarcoptidae of horses, as described in MACQUEEN'S translation of NEUMANN'S "Parasites and Parasitic Diseases of Domestic Animals." Practical work would seem to bear this out. In an unusually obstinate case, isolated in a tent, which came to the writer's notice, all ordinary and extraordinary measures as to body clothing, bedding, &c., were carried out, including the use of cresol solution for the platform *in situ*. Not until the wooden platform was removed, and its under surface and earth were treated was a cure obtained. Information available in text-books is confined to the behaviour of the male and female on the skin. Nothing is apparently on record as to habits when off the human body. Investigations on this point would be of much value].

Captain MACKIE, I.M.S., in his paper on "The Body Louse as a Carrier of Relapsing Fever" (All-India Sanitary Conference, 1912) states:—

"When full [after feeding] they leave go and make for cover . . . they transfer themselves from one piece of cloth to another when these are

* *Parasitology* of May 1918, in a paper by Prof. NUTTALL, brings together all known facts.

brushed together, and this is very marked when they are feeding, for if a piece of cloth is passed over them every louse in whatever stage of feeding at once clings to the passing cloth. This is of interest in showing how one person can transfer infection to another by casual contact."

[The fact here stated points to the supreme importance of correct laundry arrangements in fixed camps. Some authorities are liable to hesitate at the expenditure requisite in supplying central and, say, partially power driven machinery, but a comparative calculation of cost by haphazard and by systematic methods, will usually afford sound ground for adoption of the latter.]

LICE AND DISINFESTATION.

Prof. NUTTALL (*Parasitology*, Vol. 10, No. 4 of 1918) brings together the main facts requisite to be borne in mind in dealing with disinfection. These may usefully be summarized.

(p. 427). In reference to storage of clothing, it is found that unfed lice live 10 days. Hatching does not occur at temperatures below 22° C. The longest hatching periods recorded are 16 days at 25° C. in a dry atmosphere, and 23 days in a damp atmosphere at 24.5° C. "Under ordinary conditions at temperature of 12–20° C., dry storage for 2–3 weeks should suffice, in practice, to dispose of the nits which are considerably more resistant than the active stages."

(p. 428). Lice sham dead. If they turn red after subjection to dry heat, death may be accepted.

(p. 431). "Adult lice are killed by dry heat at 65–70° C. in 1 minute, and at 55° C. in 5 minutes."

(p. 433). Nits are more difficult to kill by insecticides than adult lice, but susceptibility to heat in both is practically the same.

(p. 437). In default of hot air chambers, a solution of common salt (two handfuls to the litre) may be boiled in tin cylinders, and clothing be wrapped round the tins. The solution will yield on boiling a temperature of 108° C. and clothing will be subjected to a temperature of 70°–80° C.

(p. 418). A temperature of 104° C. injures *woollen* articles; if continued for 4 hours, white flannel will be turned yellowish, but the strength of the material is not affected. A temperature of 127° C. for half an hour will make flannel yellow and brittle. Moderate dry heat renders flannels brittle, but if hung out on lines in the open, hygroscopic action suffices to put matters right.

Leather will withstand a temperature of 60° C. without injury.

Furs are not injured by a temperature of 80° C. for 30 minutes, unless they be repeatedly subjected to it. A temperature of 78° C. will injure furs if subjected to it during 2½ hours.

[The authors of the paper referred to in the preceding Note on Trench Fever invite attention to the necessity for excogitating simple methods to serve advanced parts of an Army for treatment of clothing, &c., by hot air. As offering possibilities worthy of experiment the writer suggests that to serve front positions, the means of heating should be provided by cylinders of compressed air acting on coarse petroleum gasified by heat as found in the "Lucal Heater" or "Wells Heater." These are readily portable by manual labour and as to heat production will rapidly fuse a copper wire. As a source of heat one cylinder could be transported for hot air chambers at several points

in one day. Chambers to serve areas might well be built of concrete, masonry or corrugated iron (narrow in form) and built below ground level with a roof slightly above that level; or, in emergency, a good dug-out would suffice. This would leave the essential of hot air circulation still unsolved; but the writer suggests it is probable this could be managed by fixing to the flame tube *close to its exit* at right angles to the direction of the flame, a second pipe communicating with the interior of the hot air chamber. There would result circulation of air by aspiration from the interior of the hut, and its enforced return with the direct hot air current. This would not affect the oxygenation of the flame which is fed by the compressed air. Putting aside this adaptation for lice-killing of such heat producers, there must be numerous conditions at the front where "flaming" as a disinfectant or insecticide would be of better value than chemicals.]

Hot-Air Chambers.

Putting aside the boiling of clothes, soaking in the tar product forms of disinfectants, and the use of steam disinfectors, the most convenient mode of killing the louse when dealing with the clothing and bedding of large bodies of men in uniform is certainly dry heat. At Prof. NUTTALL'S suggestion,* in 1915, Captain HAROLD ORR, R.A.M.C., used hot air huts. This has been followed by various forms excogitated by Captains GRANT and PEACOCK and Captain JACOBS. In these huts, the source of dry heat is either braziers, stoves or steam pipes. Insulation is effected by use of double walls of wood or canvas with air space between, or canvas with corrugated iron outside. In the case of that formed by Captain JACOBS (1918) sawdust is employed as a nonconductor between the walls.

As shown by PARSONS in experiments conducted on behalf of the Local Government Board many year back, hot air chambers are unreliable in uniformity of temperature of their interior.† Hence means of circulating the hot air is a very desirable addition to any apparatus. This is accomplished either by securing currents by ventilation (outlets and inlets) or by the use of fans. The latter seems to the writer the more economical method as to heat conservation. Where stoves are employed, economy of heat can be secured by using a hut of two chambers having communication by large flaps (arranged as valves looped up or shut as desired) with a small central stove chamber. During the heating of one chamber, the other can be sufficiently cooled for men to unload and again load it—yet as the temperature of the interior need not be allowed to fall to that of the external atmosphere, economy of heat is secured.

Captain D. W. JONES, R.A.M.C., when dealing with a hut (with double wooden‡ walls with the interval filled with) asbestos "packing"

* *Parasitology*, May 1918.

† In an insulated hot air hut without fans, it was ascertained by the writer that whilst the thermometer relied upon registered 180°, at certain points in the hut 140° F. only was registered. "The Surveyor," Aug. 31, 1900, cites an instance of a hot chamber varying up to 100° in different parts.

‡ A lining of cement asbestos sheets and sawdust was specified.
(C498)

designed on this principle, by the writer in the first quarter of 1916, reports as follows :—

"The data are obtained from a rough daily average of work done for 14 days :—

"500 blankets can be put through in 1 day (i.e., 4 lots of 125).

"The time taken is as follows :—

"15 min. to put them on the bars (25 bars, 5 on each bar). 10 min. to obtain the necessary temperature (we get a temperature of 170° F. with two stoves and 195° with four stoves in that time).

"20 min. application at above temperature. 10 min. to cool the chamber (opening the door and the vent).

"15 min. to get the blankets out. Time for shaking the blankets afterwards depends on number of men employed.

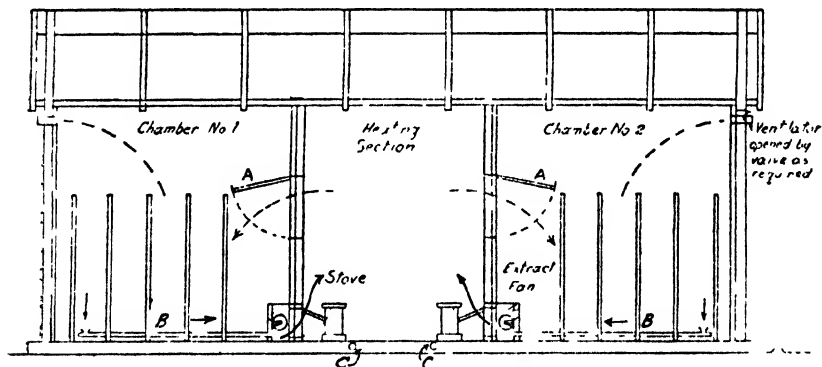
"The time it takes between putting the blankets in and when they have all been taken out is 1 hour, 10 min.

"The daily average of the amount of coal used has been 4 hundred-weight.

"There is one man in charge."

The hut yielding these results, although built in all respects for transfer of heat to one or two chambers alternately was (in the interest of economy pending results obtained by one) supplied with only one chamber ; so that had the second been constructed, a near approach to 1,000 blankets per day could have been treated.* Heating by braziers apparently cannot give equally economical results as to coal as stoves, under conditions stated. In a case for which data have been supplied to the writer, it is found that four plumbers' braziers are employed to disinfect 64 blankets in 6 hours at a temperature of 160° F. For this 4 cwt. of coal are required.

A diagram of a double hot chamber is attached. Here double walls of semi-permanent material with sawdust lining are pre-supposed ;



AA—Flaps to pass or exclude air from heating section.

B—Extract pipe.

CC—Pipe controlled by screw cap for serving stoves with external air.

Hot Air Chamber for Destruction of Lice.

the windows (not shown) are double or, if single, have shutters sawdust lined ; all doors are lined and bevelled as in refrigerator rooms. Two electric fans are shown. As, however, reversible fans are obtainable,

* Stress was laid upon the necessity for the process of shaking and beating of blankets after exposure in the hot air chamber.—W. G. K.

or one side of an extract pipe can be closed up by a valve as required, one fan in the central section of the hut could, in the interest of economy, serve both chambers.

FLY PREVENTION.

Egypt.—Captain J. DAVIDSON, D.Sc., R.A.M.C. (T.), in the *Bulletin of Entomological Research* (Feb. 1918, Vol: 8, Pts. 3 & 4), has placed on record valuable experience in dealing with fly prevention under active service conditions in Egypt.

In human faeces, he found that faecal matter deposited on sand exposed to the sun's rays attracted flies almost immediately, that the deposits soon dried with a hard coating leaving enough moisture below it to enable the ova to hatch out: numbers of maggots appeared by the third day which in two or three days turned the mass into a powdery heap. "The larvae which were small and ill fed burrowed into the loose sand and pupated." Many failed to develop and such as emerged were small and ill nourished. In depressions possessed of hard surfaces ("sabkit") maggots did not develop, owing to rapid desiccation of the faeces.

Of the difficulty of preventing fly breeding when faecal matter is massed, he states that shallow trench latrines are impossible, "as wind and sand storms constantly expose the excreta to flies," and, moreover, owing to the loose nature of the sand the identification for purpose of after treatment of an area becomes difficult. "Deep trenches even when covered with a box latrine are a danger if carelessly filled in . . . An open trench 5 ft. deep was used for three days and then filled in with 4 ft. of the desert sand without any further treatment. Flies were found emerging from the trench 10 days afterwards and numbers of pupae were found 18 inches down in the sand with which the trench had been filled." Founded upon knowledge so gained, Captain DAVIDSON practised the following methods (pp. 300-301):—

"The latrine trenches are about 8 feet deep and covered with 'fly-proof,' box-pattern latrine seats having self-closing lids. . . . Latrine trenches were sprayed daily with 'C' fluid, 5 per cent. cresol, or kerosene, the latter being the most effective in keeping flies away. . . . A mound made with tibbin and sand in the proportion tibbin 6, sand 1, with water, was formed over it. This set quite hard and practically imprisoned all flies which might be breeding out in the trench. In some districts mud or clay was available for this purpose. Fly maggots which hatch out in the trench crawl in between the sandbags forming the revetment and pupate there. The flies which hatch out may burrow their way out diagonally from the trench through the loose sand. To avoid this the mound was extended for an extra 18 inches all round the trench.

"Major E. E. Austen recommended the following method of dealing with this, which is very effective. A piece of canvas soaked in crude tar oil is stretched over the trench about six inches below the surface, extending to 18 inches all round it. A second trench about six inches deep is made round the trench and a foot from the edge of it. This is filled with sand mixed liberally with cresol and tightly packed. The whole is then covered over with a mound. In this way any flies which emerge laterally are trapped."

In horse manure. In scattered units, incineration in open temporary incinerators of horse manure was practised: but as sand was much intermingled with it the manure was sifted. These siftings were buried after treatment with crude tar oil. This was found necessary, as, if neglected, the siftings were found "literally seething with

maggots." In large camps the manure was close packed and, daily, on completion of packing, the surface of the heaps "was thoroughly drenched" with an emulsion of crude tar oil and soap, at the rate of 1 gal. per square yard. Whilst trusting to these arrangements against future development, it was found necessary at once to attempt a diminution of adult flies in the neighbourhood of the manure dumps. For this purpose, oil drums were turned upside down, so that their bottoms would serve as saucers and were placed at intervals round the manure heaps. "Early every morning, a solution of 1 per cent. sodium arsenite in water containing 12 per cent. glycerine and 5 per cent. sugar was poured on these drums. The flies collected in masses and were killed in enormous numbers, and at the end of a few days hardly any remained, the treatment of the manure preventing further breeding in it."

South Africa.—A paper by Charles K. BRAIN, M.Sc., of the Division of Entomology, Pretoria, in the *Journal of Economic Entomology* of June 1918, Vol. 11, No. 3, describes the method pursued in dealing with flies at the Remount Depot, Durban. This Depot is situated within fifteen minutes' walk of Durban and its 70,000 inhabitants. About 60 acres are available—much being recently reclaimed marshy ground. On this area, about 100,000 animals (horses, mules and donkeys) have been assembled during the war—the maximum at one period being about 10,000. The disposal of manure has been so successful that "on several occasions the Oval of the show ground has been used for patriotic functions attracting thousands of the public, and yet on no occasion has the least inconvenience been caused by the proximity of the large number of animals in the Depot, nor by the thousands of tons of stored manure."

The procedure adopted was as follows (pp. 340-341):—

"Every day the manure and litter from stalls and paddocks was swept up and carted to huge trenches previously prepared in the sand-dunes. These trenches were dug to a depth of about ten feet, i.e., down to the clay layer sublying the sand. They were often twenty feet wide and fifty to seventy long. The carting was done by a special staff of sixteen natives under a non-commissioned officer. The average amount was approximately 150 to 160 Scotch-cart loads per day. This was spread out in the huge trench until a depth of about one foot was reached when other boys proceeded to cover it with a thin layer ($\frac{1}{2}$ inches) of sand, ashes or earth. It was arranged that, in carting fresh material, it was necessary to pass and re-pass over the manure already spread so that it became well pressed down and, as new layers were added, each day's deposit received its coat of sand and afterwards its rolling or ramming down. When a trench was filled it was covered with a layer of a foot or so of earth or sand and then thoroughly rolled for two or three days. Disinfectants or lime were not added. This method of storing produces a dense peaty mass of manure which analysis shows to be of particularly good quality. One large deposit of the manure was purchased recently by an Association and a small trolley-line laid down for its removal to the railway siding.

"For sweeping manure from the stalls, hard brushes are used; and, although the work is thoroughly done, there is always a number of flies around. To deal with these four natives under a 'conductor' are constantly treating them with a contact spray. The mixture used consists of:

Caustic soda	..	..	2 pounds.
Boiling water	..	..	50 gallons.
Paraffin	..	..	5 gallons } added while
Hycol	..	..	5 gallons } hot.

"An attempt is made with this to actually hit the settled flies and it was found that a broad-bore garden syringe was more effective than an ordinary spray pump.

"Fly bait consisting of :

Arsenite of soda	5 pounds.*
Black sugar	5 to 20 pounds.
Boiled in water	25 gallons.

is distributed on blue-gum branches and pieces of sacking. These are placed in all latrines, dormitories, cook-houses and stores and are constantly renewed."

Khartoum.—Dr. BOUSFIELD, Khartoum, in his Annual Report for 1917, describes a method in which he has attempted to conserve horse manure with a minimum of risk as to fly breeding. A pit was prepared ; "horse manure was put in, then watered and well rammed down ; each day or so a fresh supply being put in and treated in a like manner." He states that between December and February the general results were, $2\frac{1}{2}$ inches from the surface many live larvae, $2\frac{1}{2}$ to 4 inches from the surface all larvae dead and many dead pupae. "Some of the dead which appeared as though they might be alive, we tried to hatch out but they failed to do so. In February, which was considerably hotter than December and January, live larvae were not discovered at a lower depth than one inch." He regards the experiment as incomplete.

HYGIENE OF MINES AND FACTORIES.

In this *Bulletin* (Sanitation Number) Vol. 6, No. 9, Dec. 15, 1915, in a note as to tuberculosis in South Africa, the Report by a Commission on the subject is discussed. The relation of dust to pneumonia and lung tuberculosis was not definitely determined, but the majority of the members were of opinion that it would seem likely that the inhalation of dust, more especially in mines when blasting set free quartz crystals in particles so fine as to constitute a haze in the atmosphere, was a "factor predisposing to pulmonary tuberculosis† and pneumonia." This was, of course, not a very definite opinion, but the Commission in recording its evidence distinctly warned that while providing a consensus of opinion founded on available evidence, it was not in a position to conduct research on any question that might arise. It had before it, however, the fact supported by statistical evidence that "pneumonia is three times as common and the mortality nearly four times as great in the underground worker as in the surface worker, and the case mortality is half again as great. Also other respiratory diseases are over four times as frequent underground." The Commission insisted upon the necessity for adequate air change underground, and means for the "prevention and allaying of dust." In connection with the mines in the Rand, GORGAS laid special stress on increasing individual resistance by improvement of hygienic conditions. The use of antipneumonic inoculation by Dr. LISTER has also been of service.

"* This seems excessively high in arsenite, being twice the amount usually recommended. It has been reported by some workers that if too much arsenite be used it acts as a repellent, defeating the purpose of a bait.—C. K. B."

† Prof. J. M. BEATTIE, in his paper embodied in the *Journal of State Medicine*, Feb. 1916, traverses this popular opinion.

This important subject has recently been dealt with in a paper by Dr. HALDANE at a general meeting of the Institution of Mining Engineers ("Times" Engineering Supplement for June, 1918) in which he has placed on record valuable facts and suggests a future line of treatment. His experiments have shown that:—

"dust particles of any kind (except perhaps when they are soluble and chemically harmless) will cause inflammatory changes in the lungs if enough are inhaled. The finest will cause harm if it is in sufficient amount, and this harm, if caused immediately, seems to be much about the same with all sorts of dust. Certain dusts and notably any unmixed forms of crystalline dusts cause lasting and cumulative injury, whereas others, notably coal dust and shale dust, cause no cumulative injury, and no injury at all unless they are present in enormous amounts."

But in apparent opposition to these conditions is the fact that, under Sir William GARFORTH's system of preventing explosion of dust in coal mines, dust is used for dilution—manifestly without harm to the health of miners, notwithstanding that this dust is found to contain 35 per cent. of quartz.*

Dr. Haldane's experiments showed that in animals exposed to the same description of dust as to time that—

"all the dust particles are taken up into the protoplasm of certain of the epithelial cells lining the air cavities of the lungs, and in the case of coal dust or shale dust these cells detach themselves and wander away with their load of dust particles. In the case of the flint or quartzite dust, nearly all the dust remains *in situ* and the cells wander out with it only to a comparatively small extent. Thus, as fast as the dust goes day by day into the coalminer's lungs, it is carried out again by the dust collecting cells; whereas with the miner breathing quartzite dust the dust for the most part remains in the lungs, and there tends to accumulate from month to month and year to year."

This difference in influence he maintains is not due to hardness or sharpness of particles or mere chemical composition of stone but to "its power of absorbing other substances." Obviously quartz would conspicuously fail in absorbent power. Hence, it is argued, the closer an approach to pure quartz particles the less likelihood of their being dealt with by the epithelial cells; yet even when they are present side by side with dust possessed of absorbent power and therefore capable of stimulating these cells, removal without harm from the lung proceeds. In proof deduced from practice, he contrasts the influence of quartz particles as found in the Mysore mines with those of the Transvaal, claiming that whilst, in the latter, quartz is the predominating rock of the surrounding country, in the former, although the gold is found in quartz, it is not the rock of the area and hence, in this case, dilution would seem probable. The remedy against quartz dust, Dr. HALDANE would propose, therefore, is similar to that applied for a different purpose by Sir William GARFORTH, namely, dilution by "dust to dust." For this purpose whilst stating that details of application have still to be thought out, he suggests that "dust from pulverized clay or shale, or a mixture of coal dust with shale dust, might be specially suitable and would be easily visible and could not explode."

* Prof. BEATTIE remarks in the *Journal of State Medicine* as quoted, that "Altott's shale . . . contains 51.92 per cent. SiO_2 , whereas China clay, which is distinctly injurious, contains 47.10 per cent. of SiO_2 , and dry grinders' dust contains only 66.88 per cent. SiO_2 ."

Ineffective Labour.

Some of the most striking lessons of the ultimate economy of expenditure on judicious sanitary measures have been afforded in conserving the physical fitness and lives of labourers on plantations and estates in the tropics. Dr. LONG, Director of Health (Report of the Philippine Health Service for 1916, p. 110) urges the importance of action being taken by pointing out that whilst active agencies are dealing with the problem of securing more labour, it should be possible by the application of a few sanitary measures, in the case of most plantations, to produce a moderate increase of 30 to 40 per cent. of the labour available. He points to the universal presence of intestinal parasites, and suggests that "other things being equal, two men without intestinal parasites can and will do as much work as three who are harboring numbers of worms." He then urges the installation of safe water supplies and reasonable latrines. In regard to the latter, he considers expense need not hinder their adoption, if the employers of labour by their construction can reduce sickness and inefficiency by 30 per cent. Permanent and well constructed sanitary houses he holds "largely add to the value of the plantation" and, in this connection, advises the employment of the bamboo reinforced concrete slabs referred to in the Sanitation Number of the *Bulletin*, Vol. 10, No. 6, p. 363. Malaria he asserts should disappear before the use of "quinine and mosquito nets and a usually not very large expenditure for drainage." Finally, he urges that "imitation of the Government action [American] in banishing polished rice from institutions will go far towards eliminating beriberi, which can be completed by inducing each family to maintain a kitchen garden, or, if necessary, forming a small area community garden."

Health and Wealth.

The speech of Sir Lionel PHILLIPS as Chairman of a recent General Meeting of the Central Mining and Investment Corporation (Ltd.) (The "Times," June 28, 1918) affords an illustration of the importance of the Hygiene of Mines in the Tropics, and, incidentally, exhibits an appreciation of the benefits of sanitary efforts in rendering industries feasible. The mines in the Rand employ 6,000 white men and 48,000 natives. The output of gold is worth about £7,000,000 per annum. The Chairman stated:—

"The health conditions at the mines, thanks in no small measure to the great services rendered by Dr. Lister, have been very good, and, in view of our having apparently conquered the most serious cause of mortality among the natives, namely, pneumonia, it is to be regretted that a proposal to try another experiment with tropical labour was not agreed to, because the disease which rendered the prohibition of their employment entirely proper years ago does not appear any longer to be a source of danger. If it could be shown that the employment of such labour had no disadvantages from the health standpoint, there would appear to be in that direction a complete remedy for the deficient supply. (Hear, hear.) Among the great countries of the world South Africa is probably to-day the least advanced in development. Industrial expansion and material prosperity there still rest, to no small extent, upon the gold output, and that, in turn, depends upon an adequate labour force."

Capacity for Labour.

The question how far it is possible to tax human labour without risking a breakdown in individuals has attracted special attention

in reference to the outturn of munitions during the present War. Enquiries have proceeded both in England and America, with the result that experience has been recorded which cannot fail to be of utility to the medical advisers* of Factory and Estate Owners, as in chief part applicable in principle to labour in the tropics.

"The Health of Munition Workers Committee" has been able to bring together from practical observation data of importance, in determining the conditions for securing the greatest work from the human machine, as observed under European conditions, with the minimum risk of overstrain. In the first place, support of the well recognized demand for a rest on the seventh day has been secured, and also of a more extended holiday at intervals. The necessity for these breaks in continuity of work is evident in the customs of tropical races when, the seventh day being of no special significance, rest is secured at regular intervals by the occurrence of religious festivals. The most striking facts, however, refer to the question of the number of hours work per day which will secure the best results *during long periods*, without endangering the morale of the worker. Observation of groups of workers by Dr. VERNON secured the following data :—

"(a) Women turning aluminium fuse bodies.

	Average weekly Hours.		Relative hourly output.	Relative total output.
	Nominal.	Actual.		
First period ..	74.8	66.2	100	100
Second period ..	61.5	54.8	134	111
Third period ..	54.8	45.6	158	109

"(c) Men engaged in heavy work.

	Average weekly Hours.		Relative hourly output.	Relative total output.
	Nominal.	Actual.		
First period ..	66.7	58.2	100	100
Second period ..	62.8	50.5	122	106
Third period ..	56.5	51.2	139	122

"During the third period, the nominal weekly hours were substantially less than during the second period, but, owing to the cessation of Sunday labour, the time-keeping was so much improved that the actual hours of work were greater than during the previous period."

* Enquiry conducted after Dr. VERNON's methods would be of sanitary and economic importance in India and the Colonies.

The Committee make the following remarks on these figures:—

"The broad fact emerges that substantial reductions of hours can be effected without any reduction of output. Whereas at the beginning of the war there was a general belief that longer hours produced larger output, it is now widely recognized that a 13 or 14 hours' day for men and a 12 hours' day for women, excepting for quite brief periods, are not profitable from any point of view." Finally, the Committee point out that the "effects of fatigue are accumulative," and are exhibited in the labourer by "conditions of irritability and nervous exhaustion."

Ernest L. SCOTT, Physiological Chemist and Scientific Assistant to the U.S. Public Health Service, has undertaken an enquiry as to the nature of substances in the presence of which fatigue of muscles becomes manifest. He gives the following summary of the present position of the subject (*Public Health Rep.* 1918, Apr. 26, Vol. 33, No. 17, p. 610):—

"1. Substances carrying hydrogen ions, as lactic, β -oxy-butyric acids, potassium dihydrogen phosphate and carbon dioxide, stand as causal agents of fatigue.

"2. Certain products of protein disintegration, as indol, skatol and phenol may produce fatigue symptoms and may be active agents in producing normal fatigue.

"3. There is some evidence that the negative ion of lactic and β oxy-butyric acids and that certain positive ions, especially that of potassium, are capable of producing certain fatigue phenomena.

"4. There is no evidence that the negative ions of carbonic, phosphoric or sulphuric acids are fatigue substances.

"5. There is no evidence at present for the existence of specific fatigue substances as proposed by Weichardt.

"6. There is very little probability that creatin or creatinine have any relation to fatigue or to muscle work in general.

"7. There are no doubt numerous bodies, as purine bases, uric acid, etc., which may be increased by work, but which have no causal bearing on fatigue."

He further states:—

"The destruction of protein suggests the possibility that certain of the protein disintegration products may have some bearing upon fatigue. . . We are now conducting a series of experiments in the Public Health Service by means of which we hope to show not only whether the output of these bodies is increased during the work day, but also whether the organism can as effectually de-toxify them after as it can before a period of work."

Food.

Vitamine Value of Wheat and Maize.

In an account of numerous experiments in the Hygienic Laboratory, Washington, U.S.A. (by Carl VOEGTLIN, G. C. LAKE and C. N. MYERS) contained in the *Public Health Reports* for May 3rd and May 31st, 1918, on the subject of the position of wheat and maize flour in regard to respective vitamines contents, it is concluded that—

(1) For pigeons an exclusive diet of "whole wheat or corn furnishes an adequate supply of antineuritic vitamine." (2) That the antineuritic vitamine seems to reside in the peripheral layers and germs of their seeds whilst the endosperm is poor in this substance. (3) If wheat and corn containing only a small portion of the peripheral layers be fed to pigeons and chickens, polyneuritic symptoms appear on an average within three weeks, but this condition can be relieved by oral or subcutaneous injection of a highly concentrated preparation of antineuritic vitamine derived from whole wheat bread, yeast, ox liver, rice polishings or beans. The addition of yeast in the proportion used by bakers for

the making of bread does not prevent the appearance of polyneuritis in birds fed as stated. Nevertheless an addition to a highly milled flour, or bread made from highly milled flour, of a small amount of antineuritic vitamine preparation will correct their particular dietary deficiency and will prevent the appearance of polyneuritis and the loss of body weight. (4) The phosphorus content of wheat and maize food is accepted as an index of the amount of antineuritic vitamine contained in these foods. (5) They regard highly milled products as inferior in dietary value as regards growth to foods prepared from the whole grain.

The white bread with which their experiments were made was inadequate for maintaining normal growth—there being a deficiency in antineuritic and fat soluble vitamine, as well as of protein and inorganic salts; whereas whole wheat bread, or wheat flour “containing a considerable part of the germ and superficial layers of the grain, supports growth of mice and pigeons especially well when supplemented with inorganic salts.”

Cereal Reinforcement.

According to the *Agricultural Journal of India* for April 1918, the Government of Bombay has issued a Press notice in which is urged the value of the ground nut* (*Arachis hypogea*) as an article of food, more especially in reinforcing wheat and maize flours. The Note first recalls the financial value of the cultivation of the ground nut in India, and the uses to which it is put on exportation. *Inter alia*, it is shown that Arachis oil (Katchung oil), which is derived from the nut, is more expensive in India where the nut is grown than in Marseilles, where before the war it was largely expressed after importation. The finest quality is cold drawn; the next is expressed at a temperature of 30° to 32° C. and is used for the manufacture of margarine; a third quality, extracted at a higher temperature, is used as a lubricant. The residue cake is utilized for cattle feeding. The comparative composition per cent., before and after extraction of the oil, is thus quoted:—

			<i>Kernel.</i>		<i>Residue cake.</i>
Water	..	..	7.5	..	9.8
Protein	..	..	27.5	..	44.5
Fat (Arachis oil)	..	..	44.5	..	9.5
Carbohydrates	..	..	15.7	..	23.8
Fibre	..	..	2.2	..	5.2
Ash	..	..	2.5	..	7.5

The Note then proceeds to define the position in dietary of vitamins, and points out that maize or legumes cannot maintain weight and proper growth and nutriment unaided in the absence of tryptophane; and that whilst wheat and barley will maintain nutriment they will not promote the growth, owing to the absence of lysine; whereas both these amino-acids are present in meat. In contrast, it is shown that besides continuing a high proportion of protein, ground nut possesses amino-acids of the lysine group found deficient in wheat and barley. Hence a judicious mixture of ground nut meal with wheat flour and other cereals is indicated. But as “the particular proteins in the ground nut meal are deficient in the amino-acid tryptophane, so in order to overcome this deficiency we add dried milk in certain proportions.”

* Otherwise known as the pea-nut, the earth nut, the monkey nut.

It is however found necessary, so as to secure ready solution, to add to the flour sodium carbonate or bicarbonate.* "The new flour then consists of ground nut cake, dried milk, and bicarbonate of soda. The latter aids as a preservative, and assists in the process of baking. . . . The flour is rich in fat and mineral salts, especially in phosphates." For bread making it is advised that ordinary wheat flour in the proportion of 3 to 1 be added "so as to make up deficiency in carbohydrates." The resulting product has the following composition per cent :—

Water	..	..	..	..	6·8 gms.
Protein	..	..	..	..	15·9 "
Carbohydrates	..	..	..	..	66·0 "
Ash	..	..	..	..	1·0 "

This represents as nearly as possible a "perfect food" and as such approximates very closely to a patent German food sold in India before the war at Rs.6 per pound (!) [The idea of combining a vegetable product of high fat and nitrogenous proportions in the form of soya bean for reinforcement of cereals has been successfully practised in Egyptian Jails.†]

The Vegetable Ration.

During the first Burmese war, British troops suffered considerably from scurvy. In cantonments in after years (with success which varied much with the grade of enthusiasm of Commanding Officers) garden allotments were sanctioned, and the soldier was encouraged to cultivate vegetables. Experience in the Mesopotamia campaign early pointed to the necessity of vegetable diet, and resulted in the despatch to that area, in March 1917, by the Madras War Fund (supported by public subscriptions) of a body of men 256 strong, known as the Madras Gardeners' Corps. This Corps largely extended a garden already in existence at Sheik Saad; they made a new garden at Baghdad and, according to a report published by "The Madras Mail" (March 27, 1918), they "helped to start numerous gardens all over the country, by supplying hundreds of packets of seeds and scores of baskets of seedlings to various units." At Baghdad, the estimated outturn of vegetables was lbs.413,829, at Sheik Saad lbs.701,224. The general verdict is that the soil of Mesopotamia possesses "extraordinary fertility."

A body specially organized to secure cultivation of vegetables is an innovation in the modern hygiene of armies that is likely to be held in mind in future campaigns. Nor in cantonments in India will the nature of vegetables used by soldiers be in future so greatly subject to local meteorological and communication difficulties. The following scale for British troops in India has recently been ordered :—

"Potatoes, ozs. 10; onions, ozs. 6; fresh vegetables other than onions, oz. 8. This scale will be varied by the issue of substitutes as circumstances may permit. When substitutes are issued, the following scale of equivalents will apply :—1 lb. potatoes, 1½ lbs. onions or 2 lbs. fresh vegetables other than onions, or 4 ozs. unsplit dhall (germinated)."

* See this *Bulletin*, Vol. 10, p. 230.

† Egypt. Ministry of the Interior; Prison Department. Report of the Prison Committee. Cairo, 1917.

The direction to employ germinated dhal would seem the outcome of the recent work by Miss CHICK (Lister Institute) in connection with the recognition of vitamins. It may be here remarked that although the consumption of legumes in a germinating condition is not followed by Indians, it is an established custom with Burmans: beans in a sprouting condition being specially prepared and sold for food purposes in the bazaars.

Eugenic Gardens.

Embodied in the Philippine Health Service Report for 1916 is a statement of work effected during the year by the Office of Hygiene and Industrial Development. This Office secured the consent of 15,000 families to the maintenance of vegetable gardens on the promise that seeds, plans and full instructions be furnished by the Bureau of Agriculture free of charge. The following fruit trees were also offered at once free of charge:—Mango, Lanzones [sapodilla plum (*Lanzium domesticum*)], Rimas [breadfruit], Papayas, Cane, Cacao. This eminently practical measure is due to it being held that (p. 7) "the average Filipino has no reserve of vitality, or as the engineers put it no factor of safety. If he is overloaded in any way, as by exposure, . . . or fever, he breaks under the load. . . . The establishment of gardens is with a view to adding protein producing vegetables to the almost universal diet, among the poorer classes, of rice and fish, thus bringing about a better physiological balance than now exists."

[The Filipino is not the only inhabitant of the Tropics whose hold upon existence can be thus described, and for whose betterment a similar movement would be advantageous.]

Beef.

Col. A. E. TRUBY, U.S. Army, in his Report of the Health Department of the Panama Canal, for 1917, states as to cattle diseases:—

"It seems, therefore, that Panamanian cattle all harbor *B. bigemina* and *Sarcosporidium*; that most of these are carriers of *Tr. theileri*, and many of them have filariasis; and that a few of them have spirochaetes in their blood."

In examining for the *Babesia bigemina* in Texas fever, he states that his results definitely establish that "for this locality (Panama) at least the brain film is far superior to the blood film for diagnosis at autopsy." He regards the Panama cattle as healthy carriers of the disease, and that "infected non immune cattle quickly acquire the acute disease and show a high mortality."

Stored Food Insects.

Under the above title, Prof. R. W. DOANE, of the Stanford University, U.S.A. (*Journal of Economic Entomology*, 1918, June, Vol. 11, No. 3), points to the economic loss which follows the haunting by insects of stores containing cereals or their products. After inspecting 100 warehouses and mills, he came to the conclusion that the most strict cleanliness, with plenty of natural light, combined with watchfulness as to infestation of sacks before their being passed in for storage, offered the best line of defence. The most noteworthy insects found by him were the Mediterranean flour moth, the rice

weevil (*Calandra oryza* L.), the granary weevil (*Calandra granaria* L.), the rust red beetle (*Tribolium navale* Fab.) and the "confused flour beetle" (*T. confusum*). The first named was particularly troublesome; "the larvae spin their silken threads wherever they go, and as they go everywhere all the machinery, the elevators and shoots, as well as the flour bins and sacks, become covered or filled with masses of webbing which cause no end of trouble for the miller."

As to methods of maintaining cleanliness, he found that "some of the best mills keep their machinery and floors and walls quite free from flour dust by using compressed air for cleansing out the cracks and crevices, blowing the dust where it can be easily swept up by brooms. Others make a practice of treating their floors at regular intervals with gasoline or kerosine to destroy the larvae and beetles and mites that accumulate in the cracks in all but the best floors." Putting aside prophylaxis, extirpation of insect pests, the authors found, possessed many practical difficulties, in respect to economical methods of storage and ownership. In a case where the underwriters of Fire Insurances objected to the use of bisulphide of carbon, the warehouse was not sufficiently air tight for cyanide and there was no provision for heating the house by steam or otherwise. The author then enquires, "What should the poor man do?" The reply to this query, as furnished by the author, is that each warehouse should disinfect sacks by means of hot air. This measure he found had been adopted in one mill. Here a "small room 8 x 10 ft. with a 12 ft. ceiling was provided with a large radiator," where a temperature of 130° to 140° F. could easily be maintained for several hours. According to the owner of this hot air room, at this temperature "all the insects are killed."

[More exact information would seem desirable as to time of subjection to the temperature stated and the extent to which penetration of heat in sacks is effected, and influence upon the stored flour. The facts, however, go to show that with strict cleanliness of a warehouse, aided by the use as necessary of a hot air room of the type now generally adopted for lice disinfestation, the enormous economic waste of food brought about by insects during storage could be prevented.]

Fish Poisoning or Cholera?

The now admitted lengthy periods during which, intermittently or otherwise, individuals may be cholera carriers, render more easily acceptable the connection between disturbances of the intestinal tract by certain food substances and cholera than was formerly possible. With the uneducated section of Indian laymen, the belief has long been held that a first case of cholera in an epidemic may follow the undue consumption of indigestible articles, owing to intervening diarrhoea "turning into cholera"; but the professional man naturally has demanded the proof of the presence of the specific microbe. failing which food poisoning in the first case and mere incidental introduction of cholera in subsequent cases would be regarded as the probable order of events. Meanwhile, both the lay and professional theorists recognized that any cause of intestinal disturbance by food articles contributed to susceptibility of subjects, should the cholera bacillus be ingested. Hence, wherever the advent of cholera is carefully

contested, there exists the routine measure of special supervision of all bazaar food products.

A good instance of this necessary hesitation in diagnosis between an incidental epidemic of food poisoning and cholera outbreaks, is reported in the 1916 Annual Report of the Philippine Health Service (p. 52). In the presence of an epidemic of cholera which was dying out, under meteorological conditions usually recognized locally as favouring that end, there occurred a sudden explosion. It was considered as probable, though not distinctly proven, that the eating of semi-decomposed fish by the population (putting aside food poisoning cases) had acted as an additional factor in incidence. The glut of fish leading to its being eaten by the lower classes in a semi-decomposed state was due to the presence of a minute protozoan, the *Peridinium*, in the sea.

"They make their appearance from time to time in Manila Bay and possibly in all Filipino waters, being particularly abundant near the surface and imparting to large zones a rustlike reddish coloration usually visible at long distances. The harmful effect of this type of protozoa on the fish is very marked and large numbers die, supposedly due to a mechanical obstruction of the air passages (gills in fish) with consequent suffocation. The invasion of certain water areas by the *peridinium* takes place ordinarily so suddenly that, although the effects of its appearance eventually clear large zones of water of all kinds of fish life, the fact is that in the beginning at least large numbers of fish of all descriptions succumb as early victims of the unexpected invasion."

POISONS.

Japan. From a Review by Dr. R. G. MILLS, of a "Statistical Study of Poisonings in Japan," written by G. TAKATA and M. KOMINAMI in the *Kyoto Journal of Medical Science* (Sept. 1917, Vol. 14, No. 6, pp. 1-130) details of articles used for poisoning or, when used as food, proving deleterious are afforded. Causation as to 4,893 instances of poisoning is tabulated. Of chemical substances potassium bichromate is of the first rank [potassium cyanide occupies a very minor place] whilst in order of popularity are mercury bichloride, sulphuric acid, morphine, carbolic acid, hydrochloric acid, rat poison (nature not stated) strychnine, arsenic and formalin.

Large numbers of plants are quoted as giving rise to poisoning, and such as have been identified by the reviewer are given with their scientific terminology. He remarks "Some of these forms are not ordinarily considered poisonous; hence they must have been consumed in unusual quantities or altered condition."

- "*Coriaria japonica*, A. (Dokuntsugi) 177, fruit.
- "*Datura Tatula* L. (*alba* Nees.), (*Chosea asagao*) 42, fruit and seed.
- "*Oycas revoluta* Thunb. (*Sotetsu*) 30, trunk.
- "Certain plant resembling *Artemisia vulgaris* (*Yomagi*) 24.
- "*Illicium religiosum*, L. (*Shikimi*) 18, fruit.
- "*Solanum tuberosum*, L. (*Jagataraim*) 11.
- "*Aconitum japonicum* Thunb. (*Uzu*), 15, root.
- "*Phytolacca acinosa* Roxb. (*Shoriku*) 9, root.
- "*Cannabis sativa*, L. (*Asa*) 7, seed and leaf.
- "*Arisaema heterophyllum*, Bl. (*Tennansho*) 7, root;
- "*Fragaria indica* Focke (*Hebiichigo*) 6, berries ?
- "*Dioscorea japonicum* Th. (*Yamaimo*) 6, root.
- "*Cucurbita Pepo* L. (*Tonasu*) 4.
- "*Pinellia ternata* Breit. (*Hebusu*) 6, root and leaf.

- ' *Oicala virosa* L. (Dopnzeri) 4, root and leaves.
- ' *Apium graveolens*, L. (Dokuzeri) root and leaves.
- ' *Diervilla coracensis*, D.C. (Hakonentsuki) 4.
- ' *Rhododendron indicum*, S.W. (Tsutsug) 3.
- ' *Cocculus Thunbergii*, D.C. (Aotsuzura) 2.
- ' *Ipecacuanha* (Tokon) 2.
- ' *Ampelopsis bclerophyllu* (Mekurabuto) 1.
- ' *Sophora japonica*, L. (Enchu) 1, bark.
- ' *Chrysanthemum coranarium*, L. (Kikuna) 1, leaf.
- ' *Ginkgo biloba*, L. (Icho) 1.
- ' *Fatasia japenia* (Yatsude).
- ' *Morus alba*, L. 1, berries, † 1.
- ' *Quercus myrsinaefolia* Bl. (Kashi) 1.
- ' *Vitis labrusca*, 1, fruit."

Numerous mushrooms are quoted, of which the chief are thus termed in the vernacular— "Tsukiyodake, Ippenshimeji, Sasadake."

Of animal substances, the roe of the globe fish (*Tetrodon*), as readily susceptible to decomposition, was the chief poison agent.

Burma. According to the Annual Report for 1917 of the Chemical Examiner to the Government of Burma, the influence of the diminution of the supply of intoxicating drugs to the Burma market by Germany is still felt. Amongst the arduous duties expected of the Chemical Examiner to Government, is the examination of articles seized by the Local Excise Department in suppression of smuggling, and their necessary identification before prosecuting offenders. Major T. F. OWENS, I.M.S., furnishes the following table:—

			1917.	1916.	1913.
Cocaine	..	..	9,423	8,495	34,366
Morphia	..	..	2,013	2,829	6,853
Opium	..	..	2,641	3,319	1,847
Ganja	..	..	1,512	1,447	248

It will be seen that, in the increased resort to opium and ganja, persons addicted to the drug habit when deprived of their special form resort to others. Nevertheless, the cessation of the baneful process of "peaceful penetration" by cocaine and morphia which Germany engineered in India and the Colonies, in so far as the war is concerned, is an evil from which good may come.

Altogether the Chemical Examiner reported on 17,883 articles submitted to him during the year—the majority being in medico-legal interest. The favourite poisons employed were opium and arsenic, alcohol and dhatura being the next most frequently used. The nature of "stains" was investigated in 1817 instances.

India. The supply of "hides" for the leather trade from India is considerable in amount. At times, trade demand is sufficiently brisk to tempt low caste Hindus who ordinarily undertake the ignominious task of dealing with dead cattle, artificially to secure supplies. But to kill with their own hands a holy cow would condemn them to perdition. Hence as a compromise, a ball of arsenic wrapped in tempting fodder lies in the animal's path and it kills itself from lack of discretion; or it may be, is deprived of its skin whilst still alive—dying obviously is its own concern. A variation to these methods is the bringing about the death of an animal by use of the "sui" [needle]. From the following extracts from the Annual Report for 1917 of the Chemical Examiner to the Government of the

United Provinces (E. H. HANKIN, Sc.D.) it is evident that this method of terminating existence is not, in practice, confined to the lower animals. (p. 3.)

"(f) In clause G, paragraph 10 of my annual report for 1916, I mentioned a case of sui-poisoning in a human being from the Drug district in the Central Provinces. I have been informed by the Deputy Inspector-General in charge of the Criminal Investigation department that several cases of poisoning by this method were reported in the year 1910 in the Bareilly, Pilibhit and Shahjahanpur districts and in the year 1916 one from Pilibhit. The 'suis' are small spikes made from ground up seeds of *Abrus precatorius*. These seeds contain a poison which is harmless or nearly harmless when swallowed but which is intensely poisonous when administered subcutaneously. Chamars frequently use these suis for cattle-poisoning. The sui is mounted loosely in a wooden holder with which the animal is struck. The sui remains behind beneath the skin. The use of suis in human poisoning is rare. Five other cases are mentioned in Medical Jurisprudence by Lyon and Waddell, 5th Edition, page 568. In one of the above cases it is stated that the deceased was awakened by feeling something pricking his cheek. He extracted the sui immediately but died two days later. The Civil Surgeon had failed to find any traces of sui in the wound when examining it by means of a magnifying glass. The intense local inflammation produced by sui is liable to be mistaken for insect bite, etc."

"The Madras Mail" gives the following notice of the Report of the Chemical Examiner (Lt. Col. MILLER, I.M.S.) to the Madras Government for 1917:—

"Among the poisons in regard to which investigations were made there are some mentioned in the report which prove how difficult it is to control poisoning in India by a Poisons Act. The poisons referred to are *Nerium odorum*, (the sweet-scented oleander), *Ocalotropis gigantea*, or the *madar*, and *dhatura*. Now these are all common plants in India, the first being found in almost every garden, while the other two may be found growing prolifically in almost all waste spaces. The poisonous properties of each of these are well-known to the people, and over their use it is impossible that any sort of control can be exercised. The roots of the sweet-scented oleander are well known to be very poisonous, and it is curious that this property of the plant is indicated in its vernacular names. The meaning of the Sanskrit name for the plant signifies "horse-destroyer," while the Arabic and Persian names have a similar meaning "asses' bane." The latter name is curious in view of the fact that the Italian name for the European variety of the same plant, *ammiazza lasino*, has a similar meaning. *Ocalotropis gigantea*, one of the commonest and most widely distributed of jungle shrubs in India, is one of the most valuable plants of its kind."

SANITARY ORGANIZATION.

RURAL SANITATION.

In dealing with races either adverse or indifferent to sanitation, it is of course necessary to study the questions of their special customs, sentiment and prejudices if, as should be the case, it is desired to induce, not to enforce, sanitary habits. This policy is readily adopted by the practical sanitarian, but the difficult point always remains as to how this is to be effected. About 1909, certain lay authorities in India considered they possessed excellent examples of self-help, by villages being placed in possession of small grants for sanitation. Here is an example of how far that theory is of practical utility in the United Provinces, as stated in the Government Review of the "Working of the District Boards," during 1916-17 :—

"There is probably no branch of district work, except female education, which arouses less enthusiasm among the village communities than sanitation. During the past year, the indifference of the villages to rural sanitation has become so marked as to induce the Government to abandon in all these districts the experiment introduced in 1912, of granting small sums to village committees formed *ad hoc* for the purpose of 'keeping these villages clean in their own way.' In Rohilkhand most of the villages offered grants refused to take them. In many districts, the grants made by the Sanitary Board have not been utilized in full, the main stumbling block being the condition attached to these grants that a quota of the cost should be found in local subscriptions. It has been found necessary to waive this condition."

[The failure at least emphasizes the doctrine of "demonstration" by effective sanitary works as the best teaching agent, provided race or caste prejudices be duly studied.]

BOARD-SHIP HYGIENE.

The important body known as the United Fruit Company of the United States accepts the principle that "prevention of disease is better than cure," and issues Annual Reports dealing with its Medical Department. That for 1916 gives an account of the organization to meet conditions arising chiefly from traffic within the tropics.

In selection of their medical officers, they demand that the medical examination of applicants "must be rigidly enforced in order to protect the Company from employing persons physically unable to work in the tropics." The Company requires that all passengers, both American Citizens and Aliens, be subject to medical examination by its own doctors on embarkment at a foreign port. The examination is undergone previous to final acceptance of a passage. Trachoma being a quarantinable disease would suffice for rejection. During examination for this purpose, the doctor must provide means to exercise surgical cleanliness and must sterilize his hands after each individual examination.

All deck passengers must be vaccinated not later than the day before arrival at a port of debarkation. Objections to vaccination are referred for discussion by the Boarding Officer. At ports where quarantinable disease is officially reported or suspected, the temperature of all persons embarking whether passengers or crew is to be taken, and anyone registering a temperature which cannot be explained by obvious cause is to be rejected. On the day before sailing, all members of the crew known on previous voyages are paraded and "pass as their names are called for inspection

and examination" with the exception of members of the Steward's Department, and new members of the crew. These are individually examined, so that the doctor should be "thoroughly acquainted with the physical conditions of each." Daily inspection and report as to general cleanliness, history of infectious or contagious disease and of preventive measures adopted are encouraged. Special attention is required to the condition of men connected with handling food.

The doctor must be present during the fumigation of a ship. Without defining causation, members of the crew found with "buboes" are sent to certain specified hospitals. Directions are given for the embalming of bodies.

The permanent employees and their families dependent upon the supervision of the Company's medical staff amount to 67,208. If to this be added the crews and passengers of steamships a total of 129,994 is arrived at. Excluding steamship employees and passengers, the death rate per mille was during 1916, 7.54. The chief diseases are malaria, amoebic dysentery and ankylostomiasis. In recording the death rate of 7.54 per mille during 1916, the General Superintendent (Dr. W. E. DEEKS) is able to point out "that it compares most favourably with that of communities in the Northern latitudes of the United States."

Some idea of the areas served by the medical organization is ascertainable from the distribution of the personnel. Irrespective of staffs serving direct under Head Quarters at New York, New Orleans and Boston, further strong staffs in accordance with localities are recognized as the Banes, Bocas, Costa Rica, Guatemala, Santa Marta "Divisions." To these are to be added staffs with the Nipe Bay and the Tela Railroad Companies.

CARE OF CHILDREN IN MOROCCO.

* Rabat, with 8,000 Europeans, has a "Goutte de Lait," a crèche and a nursery (*Garderie d'enfants*); Casablanca (40,000 Europeans) two similar institutions. These are described by Dr. Herber. The Rabat "Goutte de Lait" is housed and supported by the State. It distributes sterilised milk obtained from France as well as fresh milk. In 1917, 10,154 feeding bottles were sent out, and 131 children received 13,000 litres of milk and 67 kilos of milk powder; of the 131, 71 were natives. He gives similar figures for Casablanca. At Mazagan there is a holiday colony for European children (*Enfants à la mer*) who come from the interior to enjoy the sea breezes. The reader is reminded that the French Protectorate was only established in 1912.

* HERBER (S.). Les œuvres d'assistance médicale infantile au Maroc. *Presse Méd.*, 1918. Mar. 18. Vol. 26. No. 16. pp. 185-186.

SANITARY RULINGS.

FUNDS AND SANITATION.

Whether corporate bodies dealing with matters municipal be occidental or oriental, there are always to be found tendencies which make the world akin. Here are the terms of a protest by Dr. Paul CLEMENTS, Chief of Division (Report of the Philippine Health Service for 1916, pp. 90, 92 & 93), against the frequent tendency of corporate bodies to regard sanitary matters, where Budget allotments are concerned, as of a philanthropic character that may well be deferred, in favour of what are estimated as more practical and common sense demands upon the public purse. Dr. CLEMENTS states :—

“ When the municipal budgets for 1916 were submitted, the provincial treasurer ruled, upon his own responsibility, that the authority to postpone the date of organization had voided the previous favourable action of the municipalities, and disapproved, upon this ground, those municipal budgets which contained assignments for the health fund. By the time this action came to the notice of this office, the Municipal funds had been so handled that there was nothing left for the health fund, and it became necessary to dissolve the organization at the end of March. . . . Provincial Governments should not, as many of them appear to do, regard health organization as a luxury to be provided only after all other Governmental functions have received attention, but should realize that the protection of the public health is one of their most important duties, and that the law which prescribes the form which that protection shall take is mandatory in character, and requires them to maintain a health organization in exactly the same degree that it obliges them to pay the salaries of the Governor and other functionaries of the province. . . . In the provinces already organized there is a persistent tendency, whenever the necessity for economizing arises, to do so at the expense of the health fund instead of making a proportionate reduction in the expenditures of all departments. . . . Nueva Ecija, in possession of a neat balance in the health fund from previous years and with a laudable desire to increase its mileage of good roads, secured authority to loan the balance to the road and bridge fund. It was found later that the current contributions to the health fund were insufficient for the maintenance of the work, with the result that a number of employees of the health organization were dismissed, and that the salaries and the travelling expense accounts of others are several months in arrears.”

[Difficulties of the nature above recorded show that Dr. CLEMENTS appreciates the fact, often not learnt by the sanitarian in our tropical possessions till long experience forces it upon him, that, if his work is to go beyond mere preaching of what the layman is apt to regard as “ fads,” he must by *timely* manoeuvres capture the Budgets of the Bodies concerned. It is in securing definite and, in proportion to other demands upon the public purse, reasonably sufficient *preconceived* allotments for improvements year by year that his work will advance. As an example of the nature of legislation or executive rulings by which the sanitarian may secure a voice in the distribution of funds, the methods adopted in the Madras Presidency may be quoted. The District Medical and Sanitary Officer of each District (areas of which may be about 7,000 square miles) if not a member of a Municipal Council has the right—after notifying the Chairman—to address a Meeting of the Council and exchange views on any subject. This right also rests with the Sanitary Commissioner and his Deputies. The District Medical and Sanitary Officer is invariably a member of

District Boards. Both as to Municipal and District Board Budgets, he has the right to advise and, in the latter, to vote as to expenditure. If he is keen enough to watch for the period of official compilation of Budgets in the preparatory stage, he has the right, under a Government ruling, to consider the whole Budget in its proportional bearing upon sanitation, and to make suggestions for re-arrangement of the various heads of proposed expenditure, irrespective of his ascertaining that sanitary projects which have been "deferred till the next Budget" have been duly entered. Finally, all Budgets in respect to sanitary provision are referred to the Sanitary Commissioner by the Government for his recommendations. These are duly considered, recorded and published with the Government decision thereon when finally approving the Budgets of the Local Bodies concerned. Of course, under the self-government methods of British administration, it by no means follows that the sanitarian will be able to obtain all he desires; but the various rulings at least secure that, in the clamour for funds raised by various interests, he is not voiceless.]

TOWN PLANNING.

In his paper read before the All-India Sanitary Conference of 1912, Mr. TURNER, I.C.S., then Special Officer, Building Sites, at Bandra, brought to notice a point of importance as to necessary legislation in Town Planning. Legislators are apt to accept Acts in force in Great Britain as embodying sound legal procedure. This doubtless is true, but it does not follow that the rulings secured by such legally sound Acts meet the requirements of tropical conditions. Thus, the Housing and Town Planning Act (1909) of England relies upon "agreement" with owners, and therefore deals weakly with the principle of "redistribution" which is fully enforced in the prototype Act in Germany. He urged the necessity of these principles being combined in legislating for conditions found in India; and there can be no doubt that these requirements would be equally essential in our Colonies where town planning legislation is attracting attention. Mr. TURNER considers that where

"the holdings are mostly small and irregular in shape, power to rearrange them is absolutely necessary to promote development by carving out plots of suitable shapes and sizes, and to give every one access to proposed roads. Whether the holdings be small or large, one great advantage of redistribution is the power to cut out plots from the larger holdings and to allow them to such owners as are dispossessed from their lands by the advent of roads, market places and other public sites, for thereby the capital cost of a scheme is reduced to the extent of the value of the plot allotted, and the owner of the holding out of which the allotted plot is carved will have his cash contribution for 'betterment' reduced by the cash value of such allotted plot."

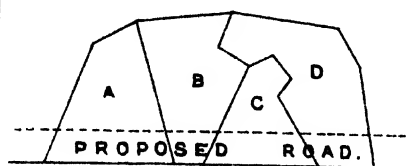
He illustrated the efficacy of the power of redistribution by the annexed useful diagrams.

The Bombay Presidency now possesses a "Town Planning Act." In referring to the areas in which this Act has been put in force the Government of Bombay in their Review of "Reports on Municipal taxation and expenditure" for 1914-16 gave expression to the following opinion* :—

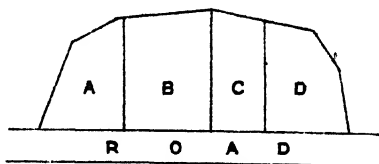
* Resolution reviewing the Reports on Municipal Taxation and Expenditure in the Bombay Presidency (including Sind). 1915-16. Bombay: Government Central Press. p. 14.

DIAGRAM Nº I.

A.

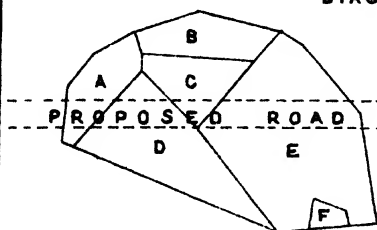


BEFORE REARRANGEMENT

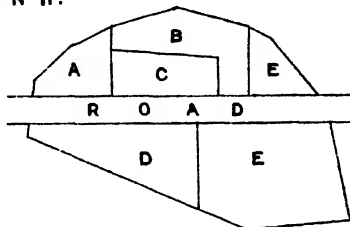


AFTER REARRANGEMENT

DIAGRAM Nº II.

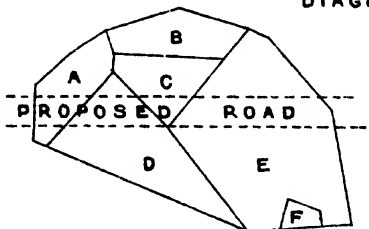


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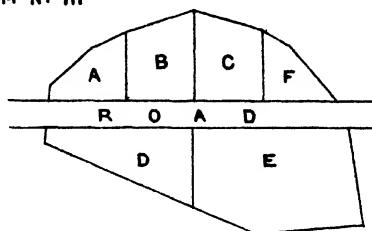


AFTER REARRANGEMENT

DIAGRAM Nº III

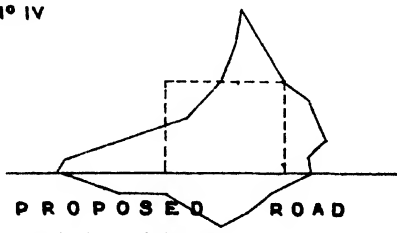


BEFORE REARRANGEMENT



AFTER REARRANGEMENT

DIAGRAM Nº IV



VALUE OF ORIGINAL PLOT 800 Rs.
 VALUE OF FINAL PLOT 700 Rs.
 VALUE OF FINAL PLOT AFTER
 CONSTRUCTION OF ROAD 1500 Rs.
 OWNER'S LIABILITY $(-100 + \frac{1}{2} \times 800) = 300$ Rs.

"In the opinion of Government, no set of town improvement schemes can possibly do as much good as the enactment of properly considered building regulations and their strict enforcement. With a view to regulate the construction of buildings on hygienic principles, Government in 1914 called upon the larger municipalities in the Presidency to take into consideration the question of the incorporation in their building rules of the principles of the 63½° air plane and light plane rules. . . . In order, therefore, to enable municipalities to bring their building by-laws up to a satisfactory standard, model building by-laws suitable for these bodies are being drawn up."

UGANDA.

As stated in the Annual Medical and Sanitary Report for the Uganda Protectorate for 1916 (p. 13) the following rulings have been put in force:—

"(1) The alteration of building rules dealing with construction of dwellings particularly as regards ventilation. (2) Rules giving increased powers to the Township Authority in the matter of removal or alteration of existing buildings which are unfit for habitation, as well as summary powers for destruction of buildings which are a danger to public health. (3) Rules reserving buildings or parts of buildings to the strict usage for which they are designed, *e.g.*, shops, grain and cotton stores, and dwellings. (4) Rules giving powers to the Governor to reserve areas in the townships for European occupation only."

TYPHOID IN SAINT LUCIA.

The Report of the Health Officer on the Sanitary Department, Saint Lucia, for 1916 [which has been received during the present year] refers to an epidemic of typhoid at Canaries, in which there were 140 attacks with 13 deaths. The causation is not stated, this having apparently been placed before the Administrator "in several Reports already." Presumably, there was a connection between the epidemic and water supply as the following statement occurs (p. 1):—

"To prevent recurrence I propose to keep up the supply of boiled water until the scheme for gravitation supply is complete, or else instal a temporary rain water tank for drinking water only. Until the refuse jetty is completed, the pit system must be kept up, but unluckily the amount of land available is strictly limited, and we are now nearly at the end of our tether."

The possibilities of sanitary effort seem to have been greatly hampered by the lack of any ruling which would compel the owner of houses to pay for their sanitary care. "They provide no roads, no drains, no means of refuse and excreta disposal." Moreover there exists no system of refuse collection and disposal—"At present everything is thrown into the undergrowth regardless of consequences." [Under these circumstances, the position of the Health Committee would seem more of the nature of a sinecure than that of the Health Officer, who had both the medical and sanitary work involved in dealing with the epidemic. The Committee however justified their existence by passing "some Regulations to deal with measures *outside* [italics not in the original] the two mile limit from towns or villages . . . one set to deal with nuisances outside the two-mile limit from towns or villages, another making typhoid fever notifiable like plague, smallpox, cholera, and yellow fever."]

In the absence of a system of conservancy the M.O. acted as follows (p. 2) :

"Experiments in sewage disposal for the area surrounding the town were carried out. The local system of dealing with excreta, which seems to have existed from time immemorial, is to keep all in one vessel in or below the house until night-fall, then carry it out and dump it—frequently in the handiest river, ravine or patch of bush. The Hookworm Campaign's privies did not seem to promise well in populous districts, so an attempt was made to meet local customs by providing a central pit, fly proof and efficiently drained, where the people could deposit the excreta as they do in the Town Board barge. The pit in Marchand cemetery has been a success ; although conditions have been against it ; it is sunk in clay soil, and the weather has been abnormally wet, yet it has not flooded, is quite inoffensive, and free from flies."

CHOLERA CARRIERS.

The Philippine Health Service continues in persevering efforts to guard against cholera epidemics due to potential cholera carriers. The following important ruling has been put in force by Dr. J. D. LONG, the Director of Health, Report of the Philippine Health Service for 1916 (pp. 58-59) :—

"To all medical officers in charge of city health districts, infectious disease hospitals, and detention wards.

"Among other new facts recently disclosed with reference to the course followed by cholera epidemics one of the most prominent is the intermittency observed in the discharge of bacilli by some persons who had been proved to be cholera carriers. Persons were found who had been carriers on four different occasions with distinct negative intervals averaging from two to six days.

"This makes it imperative for health officers to no longer consider as absolutely safe, those individuals who having recovered from cholera or having been once recognized as cholera carriers have been released from isolation after three or four negative results from examination of their feces.

"The following procedure is therefore adopted for the future :

"1. In the bacillus-carrying survey made in and around the infected spots the taking of stool specimens shall be insisted upon at least three times in persons showing negative results. An accurate register of this survey will be kept in accordance with the accompanying model blank No. 1.

"2. Persons discharged from infectious disease hospitals and detention wards (recovered cases and carriers) shall at the time of their release have their residence address verified by an assistant sanitary inspector. An accurate list with the names of persons so discharged and their residence will be made daily and forwarded to the corresponding health station. A preliminary report by telephone will precede this written list.

"3. Medical officers of health districts will see that a register be kept (see attached blank No. 2) of those persons discharged from infectious disease hospitals and a weekly stool specimen taken until a period of two (2) months is covered. The register will show how many times each person has shown previous negative results. Any change of residence shall be reported to the corresponding station. It is understood that any *positive* result shall cause the carrier to be again confined at San Lazaro.

"4. The medical officer in charge of Bilibid Prison is hereby instructed not to permit any prisoner under suspicion as a cholera carrier to be detailed to any outside work, and in case of release from the institution, such persons shall be subject to the same rule as observed in San Lazaro."

TREATMENT OF WASTE.

NIGHT SOIL.

One of the several difficulties as to successful disposal of night soil in India, is that the procedure concerned must be entrusted to a special and low caste. That caste, in the presence of education, is in the process of looking elsewhere for its duties, and its service is becoming less readily obtainable. Hence, the importance of creating a demand for night soil in agriculture. Unlike the Chinaman, the caste Hindu agriculturist will not ordinarily himself take any part in placing this fertilising substance on his soil. In certain parts of India, however, it has been freely used; for instance, in the neighbourhood of Poona it is eagerly sought for in the cultivation of sugar cane. For cultivation of rice in the area surrounding Madras City, a cartload of solely faecal matter will secure a far higher price than one of vegetable rubbish. In the immediate neighbourhood of most District Municipalities, there is also a fair demand; but this is not the case in strictly rural areas.

The *Agricultural Journal* (India) for April, 1918, makes a demand for the further use of night soil, and points to the necessity for the excogitation of simple methods for favouring its sanitarily safe employment. In this matter it strikes the important note of financial inducement to the ryot, and publishes experiments which demonstrate that this exists in solid form. Increases of crops per acre beyond those obtainable without the use of night soil were produced as follows:—“*Jowar*” (*Andropogon Sorghum*) grain lbs.173, fodder lbs.5,914; in value Rs.92. *Cottonseed*, cotton, lbs.775; in value Rs.119. *Rice* lbs.480, straw lbs.635; in value Rs.21.

[So long as the Agricultural Department requires that its officers take every opportunity of thus demonstrating (by exhibition *in situ* of crops grown by the use of night soil) the money value side of the question, the ryot may be trusted so to arrange that the labour he employs shall be of a caste that will not seriously object. In the Madras Presidency, practically all municipalities have for many years been able to secure a revenue by sale of night soil. This is arranged to be sufficiently long trenched to render the resulting enriched soil odourless in handling. In well supervised night soil depots, each trench is identified as to period of burial of contents; and before being offered for sale in auction, it is ascertained visionally that nitrification is complete. The ryot recognises the earth as a purifier, in accordance with the teachings of Manu, and has no objections to handling the poudrette. In the writer's experience, when there has been no demand for such trenched night soil, it can be secured by the Municipality concerned cultivating over its trenches for the purpose of demonstrating results to agriculturists. There is no difficulty in such cases in making a favourable contrast with crops in the immediate neighbourhood where night soil has not been employed. Under such circumstances ryots hearing of good results will journey long distances to verify facts for themselves. Trenching for this purpose presupposes in respect to flies and ankylostomes safe depths of trenches, and safe distances from inhabited areas.]

SANITARY WORKS.

ANTI-MALARIAL DRAINAGE OF RAVINES.

Dr. Malcolm WATSON's* successful struggle with malaria in the Federated Malay States has shown that ravines in that area demand special efforts in anti-malarial treatment. There have to be considered the ever changing surface of ravines due to scour and alternately the deposit of silt favouring the formation of pools following flushes by rainfall, and, at times, water collections in accord with varying factors affecting surface and subsoil waters. Such matters require intimate consultation and co-ordination between sanitarians and engineers. In this aspect of the matter, the Federated Malay States have shown excellent specific instances, more especially as illustrated by the efforts of Mr. EVANS, Engineer to the Local Malaria Advisory Board, and more recently in the case of Mr. E. R. RICHARDSON. The latter Engineer in April, 1918, read an interesting paper before the Society of Estate Medical Officers on the subject of distribution of mosquitoes from a Civil Engineer's point of view. He lays down the following as the desiderata to be observed :—

- "(1). To trap the flying mosquitoes before destroying the breeding grounds.
- "(2). To obtain a method of destruction of larvae and pupae which would be certain in its action, and leave no chance of escape.
- "(3). To control the silt problem.
- "(4). To reduce the area requiring oiling, and the frequency of oilings.
- "(5). To reduce cost of maintenance and supervision to a minimum.
- "(6). To render all possible breeding grounds easy of access for the purpose of investigation.
- "(7). To make the rich soil of the valleys available for cultivation.
- "(8). To ensure that all agricultural requirements be complied with and combined in the scheme.
- "(9). To acquire general adoption by making the scheme a cheap one."

He considers that drainage is "the only system which can comply with these conditions," but that in the Federated Malay States it is the most costly of all. He then proceeds to expound methods of drainage which he believes would be effective yet economical. He relies upon ditches on each side of ravines cut to a stratum of decomposed rock within which is normally found the subsoil water, at depths from "three to four feet of the surface at the edges of ravines." He advises that, "the width of a drain should not exceed 18 inches and if properly located there will be practically no caving in to a depth of six feet." [An excavation of a breadth of 18 inches to a depth of six feet is unusual.] Instead of using agricultural subsoil drains leading to a central drain in the ravines, he would reverse the procedure by tapping at site of occurrence and discharging into the side ditches. In regard to silt caused by scour, he considers that "with side drains the soil from which is banked upon the ravine side and the wash conveyed over by head-ditches to flumes at suitable intervals, the wash is spread evenly over the full width of the ravine between the artificial banks of the side drains, which would be protected from the scouring action of the flood waters by short brushwood fences placed to

* The Prevention of Malaria in the Federated Malay States: Liverpool School of Tropical Medicine.

divert the current towards the centre. Debris and logs could be used at intervals to deposit the silt and settle it evenly over the full width of the ravine."

In accord with the method advised by LE PRINCE and ORENSTEIN ("Mosquito Control in Panama," p. 450) he would rely for larvae destruction upon flushing the side drains, by use of portable or automatic gates. Pipes "inside the drains," he suggests, would be longer serviceable than subsoil drains as at present used, which are liable to choking, as "they are commonly buried in sand which finds its way through the leaves."* Lastly he affords the following utilitarian support to his scheme:—

"There is one other important feature to be mentioned, and that is, the tapping of all the water flowing from the ground at bedrock in a protected ditch makes the water available for water supply to be delivered by hydraulic rams. This will save some thousands of dollars on many estates."

In the discussion which followed Mr. RICHARDSON's paper, Dr. MALCOLM WATSON, as Chairman of the Meeting, advised further consideration of the whole subject before coming to any conclusion, and suggested caution as to trusting to flushing for getting rid of the *Maculatus* as both in his own experience and in that of Panama, "there was nothing like *Maculatus* in its capacity to hang on to the sides of drains." He believed also that "hill-foot drains might become stopped with silt."

[Judging from description and photographs by Malcolm WATSON in his "Prevention of Malaria in the Federated Malay States," it is unlikely that it would be possible to deal with the ravines by any single method. Having settled what is to be aimed at, the engineering method employed must be adapted for the special section of ravine dealt with. In a previous note on this subject,† the writer suggested that instead of the laborious system of subsoil drains in detail within the ravines, it should be possible to attack the subsoil water by a subsoil drain *at long intervals* external to the ravines at right angles to the subsoil flow and discharging, as at present, to central drains within the ravines; so as to lower the level definitely over considerable lengths of a ravine dealt with, by increasing freedom of discharge at selected points; and, secondly, to arrange for silt deposit by discharge from the ravine for flood water and leading this to points suitable for "terracing" (the method advocated by BUCK) and if necessary conducting the cleared water back to the ravine at lower levels. By diminishing the volume of discharge in a given time the method would minimize scour and, in some conditions, control size of central drains. Even then it was pointed out that the substream (which would include not only the subsoil water derived from areas above the point of surface emergence within the ravine, but also true substream water derived from infiltration of the visible stream due to local rainfall) would be forced to the surface by irregularities and

* It is understood that this poor substitute for gravel surrounding the open points of subsoil drains is due to cost in this area of obtaining the latter material, but the decomposed rock found on the spot should be an easily manipulated alternative, irrespective of possibility of employing burnt clay in nodular masses.

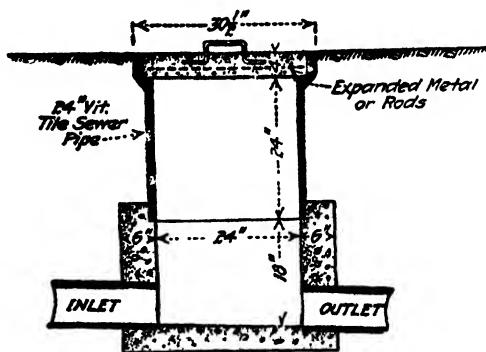
† This *Bulletin* (Sanitation No.) Vol. 5, No. 8, June 15, 1915, p. 480.

obstruction of the ravine surface. Mr. RICHARDSON's scheme recognizes the principle of dealing with silt by using flumes, and also of cutting off the subsoil water. His method of side ditches destined to deal with both storm and subsoil water would accomplish requirements, if a continuous subsoil drain were placed below normal subsoil water level within the two side ditches, and were the latter not likely to suffer from scour. There would however still have to be dealt with collections of substream water in the old ravine,* and the possibility that in what would amount to three ditches in place of one, the mosquito would have his opportunities multiplied.

In the writer's opinion, the most hopeful possibility is contained in Mr. RICHARDSON's idea of using the subsoil flow for "water supply to be delivered by hydraulic rams." He adds, "this will save some thousands of dollars in many estates." If, as would appear from this statement, there are estates in the course of the ravines at successive low levels which could be served with financial benefit, the writer believes all question of subsoil drainage by use of pipes might be abandoned in favour of infiltration galleries cut directly across the ravine course through the decomposed rock stratum containing the subsoil water. These infiltration galleries, led conveniently to the surface at lower levels, could supply water under pressure for power or for minor purposes according to the circumstances influencing points of delivery, quantity, &c. Such galleries repeated at judiciously chosen intervals should effectually lower subsoil water level in the decomposed rock stratum in the ravine course, and prevent the seepage which is now the main source of trouble.]

CONSTRUCTION MATERIALS.

A world demand for iron for belligerent purposes is an incentive, in the interests of economy both of money and time, to the securing



Precast Concrete Plate fits on to the Top of Vertically Placed Sewer Pipe to form Manhole.

of substitutes for that metal in certain portions of sanitary works. The "Engineering News Record" (New York) of June 20th 1918, p. 1,182, gives the following plan and description of a useful form of

* Mr. RICHARDSON would trust to "water left in depressions" draining away "in sufficient time to prevent the breeding of mosquitoes." This seems unduly optimistic.

manhole in which a reinforced concrete lid is employed. The absence of an air seal for the seating of the lid might render it unsuitable in the proximity of dwellings, but elsewhere it should be found usually a convenient form :—

“Manholes on several of the Ohio River locks and dams have been standardised, as is shown on the accompanying drawing by O. Butler, superintendent for the United States Engineer office at Wheeling, W. Va.

“A 2-ft. section of ordinary 24-in. vitrified tile sewer pipe forms the upper part of the manhole. It is set upon a concrete base, through which the sewer proper passes. The manhole top is closed by a reinforced-concrete lid having an iron handle. No special form is required to make the lid, as a section of the 24-in. sewer pipe, filled to the bell with earth, is used as the mold. Lids in use have proved entirely satisfactory even with hard usage.”

In this *Bulletin* (Sanitation No.) May 15, 1918, Vol. 11, No. 5, p. 362, the desirability of water works not being delayed by the present rise in price of iron pipes was alluded to. “The Times Engineering Supplement” of July 1918 reports an instance in point :—

“Finding itself unable to obtain iron pipes of the required dimensions, the Borough Council of Oamara, in New Zealand, has adopted a continuous stave wood pipe for conveying water to its hydro-electric plant. The pipe which is 1,635 feet long and 36 in. in internal diameter, contains 2,628 staves of Oregon timber, 1½ in. thick, with 11,280 steel bands weighing 8 lbs. each, and 12,000 steel shoes.”

HYDRAULIC RAMS.

To secure so cheap a pumping installation as implied by the use of the hydraulic ram in dealing with any but petty deliveries of water, should foreshadow many possibilities in the water-supply of tropical towns. The ram of the type hitherto available is so expensive in water used for power in proportion to the amount lifted that its employment can rarely be even considered.

“The Engineering News Record” (New York) of May 23, 1918, p. 1,000, however, shows that for the supply of a population of 28,000 of the City of Seattle an improved form of hydraulic ram is now operating, and under 48 foot power head and 131 foot pumping head there has been secured a 91 per cent. efficiency. In this case, a normal daily capacity of the plant has been proved to be 1,000,000 gals.

AIR LIFT PUMPS.

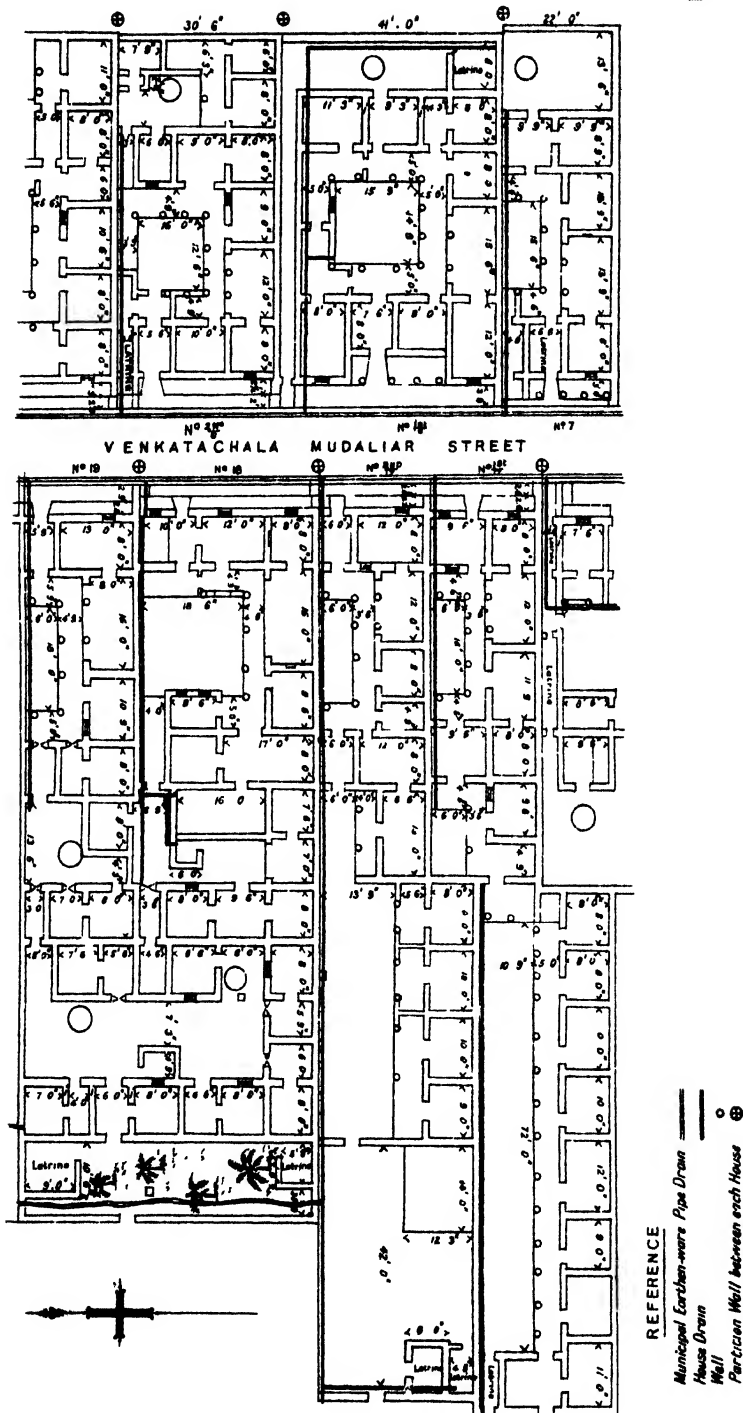
The following extract from conclusions afforded in a paper read before the Institution of Mechanical Engineers by Mr. A. W. PURCHAS, throws light on the sphere of utility of air lift pumps :—

“The hotter the liquid pumped the higher will be the efficiency of the pump; according to Professor Randall an efficiency of 100 per cent. is possible under certain conditions, when pumping water at 200 deg. F.; many flowing oil-wells are really air-lift pumps using natural gas; the fuel consumption of air-lift pumps can be made to compare very favourably with that of any other type for raising liquid more than 75 ft. from a well, though for shallow wells centrifugal pumps will probably prove more economical.”

HOT WATER.

“Indian Engineering” quoting the “Electrician” states that, in the City of Morovia “quite half the inhabitants make use of sun-heated water. The water is exposed in copper coils on the roof, or

other convenient position. [No statement is made as to diameter, &c., of the coils nor of the temperature secured. That if desired boiling point could be secured and would be but a matter of expenditure is probable if the sun's rays were reflected on the coils by mirrors—as commercially employed for steam power in one or more instances in Egypt.]



LANDS AND BUILDINGS.

TOWN PLANNING.

In India, the importance of town planning has during late years attracted increased attention. The plague epidemic and, latterly, the considerable interest awakened as to the construction of the new Delhi have proved incentives. The Government of Mysore made an early move in the matter, by constructing an extension of the city of Bangalore on modern lines as one of its chief weapons against plague. The Improvement Trust of Bombay has done much to merit its official terminology. It has still a heavy task before it. Calcutta has also its Improvement Trust and is at present dealing with a large scheme.

The Madras Presidency has shown interest on the subject of town planning not confined to simple cities. Before the war, its Government engaged Prof. GEDDES who gave a series of interesting lectures to District Municipalities and the public. Two I.C.S. Officers (Mr. LLOYD and Mr. LANCASHIRE) were placed on special duty to enter into details with the Municipalities. They rendered efficient reports which, with the remarks of the Sanitary Commissioner on the points raised, were forwarded to Government for decision. Whilst many preliminary matters were thus under consideration, it is obvious that much of these schemes must be held in abeyance pending peace conditions. In the meantime, a Town Planning Act has been passed through the Legislative Council.

The Madras City with its half million inhabitants has so many problems peculiar to itself that it secured the services of Mr. H. V. LANCHESTER, F.R.I.B.A., who has published a Special Report on the subject of "Town Planning in Madras," published by Constable & Co., London.

Indians supplying labour to our Colonies bring with them preconceived ideas of house-building, and the resulting structures, in the absence of suitable legislation as to town planning, are apt to trammel sanitary advance. For example, in the Report by Prof. W. J. SIMPSON, C.M.G., in 1913, the conditions described by him as existing in Nairobi are those common either to Madras or Bombay. In practically all extant plans of such conditions in tropical towns blocks of houses are shown without exhibiting details of interior accommodation. In a Report to the Government of Madras, in 1894, as to the sanitary state of Madras City, the writer pressed the question of attention to congested portions of the city, and by way of bringing facts home secured the preparation in detail of such an area.* As this may prove useful in interpreting the predilections in house construction by Indians in the Colonies, a portion of the plan is reproduced. Taking this as a sample of conditions† to be found in the tropics, it is evident that aesthetic requirements of streets with or without curves, and of round or square open spaces, might be given effect to at enormous expense, with a minimum of sanitary influence upon the population generally.

Evil construction of individual houses is more confined to single localities or towns in Europe than in the tropics, and under the hand

* Venkatachala Street, Purasawalkam, Madras;

† In this instance each room is ordinarily considered sufficient for a whole family; a solid door is relied upon for light and ventilation.

of the aesthetic plan-maker eradication of evil spots may follow his effort in *course of time*. But this is an unsafe procedure where not mere spots but whole towns consist of conglomerations of poorly devised dwellings, with which are interspersed, at long intervals, architecturally good buildings. Indeed, in towns in the tropics, as a general rule, it will be found that the first efforts should concentrate upon the question of future types of houses to be permitted and, where reform of those existing cannot be effected synchronously with town planning improvements, the settling of where and how the people are to be housed must be first definitely agreed upon. Against this hard fact, the Calcutta Improvement Trust (after duly securing various plans for wholesale street improvement) is at present being pressed by the inhabitants of the area to be dealt with.

BUILDING MATERIAL.

The increasing employment of concrete, reinforced or not, in house construction renders it necessary to watch for experience gained in temperate climates which is likely to be of utility in the tropics. To this end the following items from a paper by Mr. Frank BAINES, O.B.E., M.V.O., Principal Architect H.M. Works * are noted.

He considers concrete block more suitable than the monolithic system, as blocks are simple to handle and are of advantage in damp resistance. Hollow six inch blocks have little advantage over solid blocks, "as the connecting portions conduct the moisture between the outer and inner faces. . . . Blocks 2 or 2½ in. thick with a 2 inch cavity between secured with galvanized iron wall ties, the outer block being made with a dense aggregate and the inner block with a more porous material" yield the most satisfactory result in one story buildings. [This block form should be useful in hot climates and has been advised.] "In two storied buildings the thickness must be increased or piers introduced when necessary." Two inch coke breeze slabs form good partitions. Ground floors of 4 in. cement concrete upon 4 in. of good hardcore finished with a jointless impermeable flooring devoid of magnesite are advised.

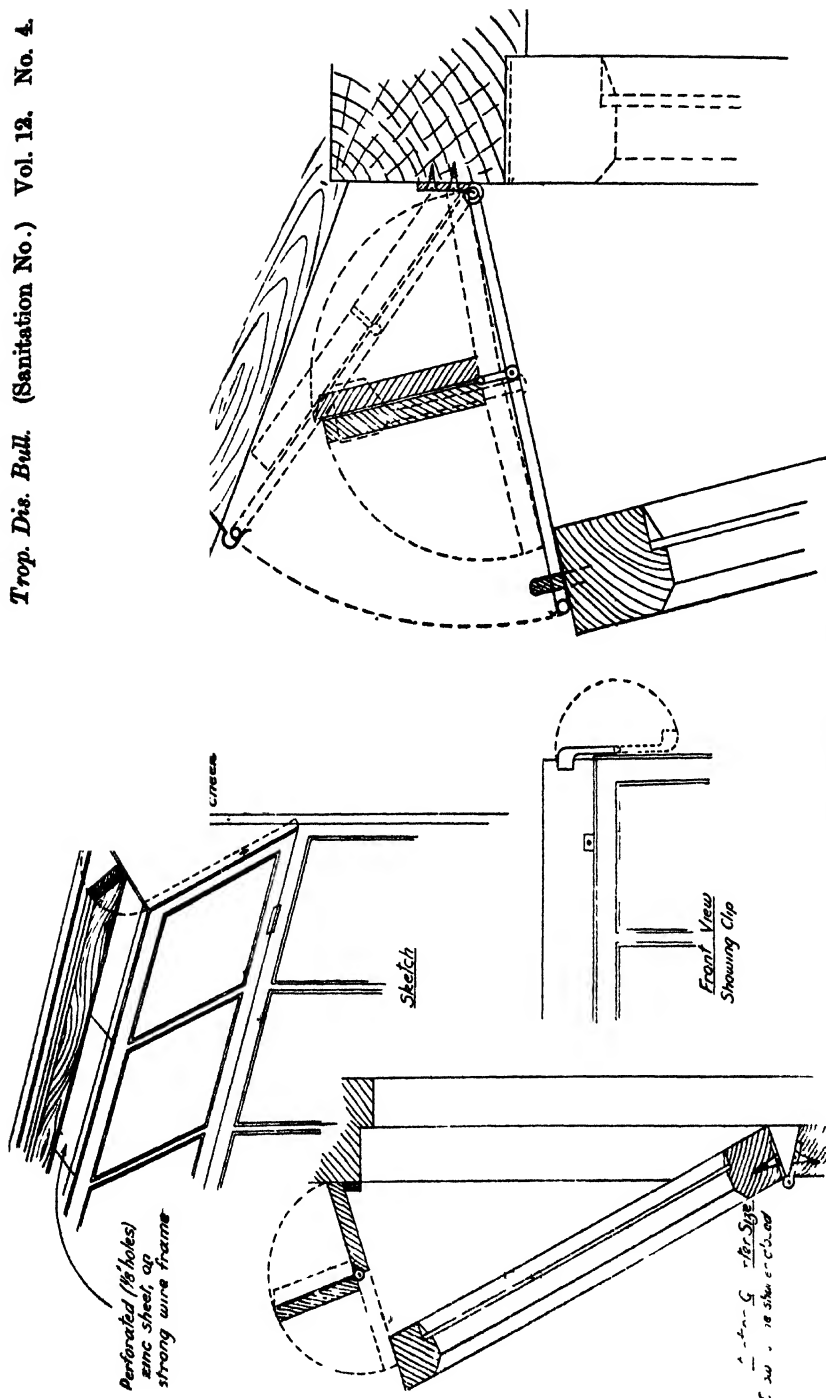
In upper floors, he has found concrete cast slabs upon concrete beams uneconomical; instead—

"hollow brick or terra cotta blocks have been used, slightly reinforced between the blocks with steel tape or thin rods. They are finished off with a jointless flooring of blue lias lime plaster, with reed reinforcement. This has given a very satisfactory floor, and saves flooring with any proprietary article. This method can also be utilised for wood joists, in which case lathing will have to be carried out across the tops of the joists."

THE McLEAVY AIR DISTRIBUTOR.

In the War Office pattern of wooden huts [60 × 15] which during the war has been largely used in semi-permanent camps, each of the windows has a flap which when open permits of fresh air entrance and, if an opposite window be similarly utilized, allows of good perfilation. Draughts are rightly objected to by the inmates, and hence the necessity for some method of regulating the rate of air entrance. Without some such arrangement whilst by fastening the window flap at a certain angle air currents may be directed upwards, they still

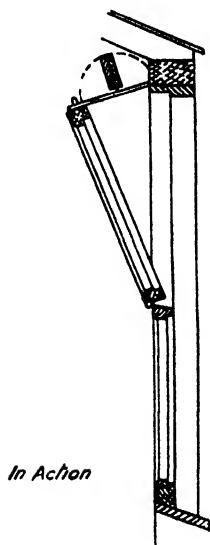
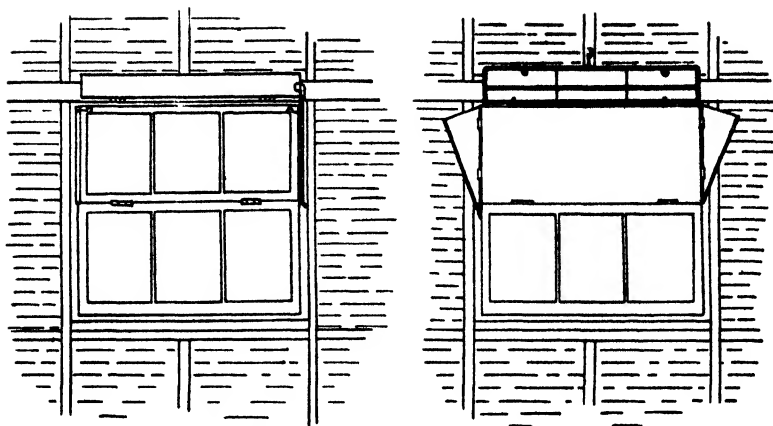
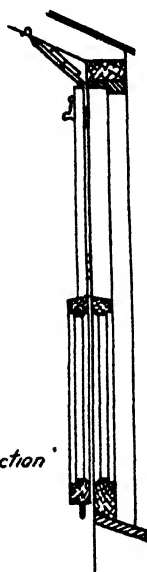
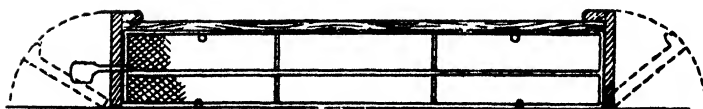
* *Jl. Roy. San. Institute*, 1918. June. p. 29.



McLeary Air Distributor.

(C498)

21

*In Action**Out of Action***McLeavy Air Distributor.**

enter without change of direction at each side, and produce discomfort for men who sleep with their heads to the wall. With a blustering wind on a cold night the conditions are undesirable. Consequently, early in the war fixed and moveable flanges appeared in some huts which obviated the downward draught from the sides. In camp stores the flap fixed at a suitable angle with fixed wooden flanges and with wire netting over the vacant space has also been used. Such an arrangement however would prevent the flap being fully opened when desired and trammelled cleansing.

The accompanying sketch plan shows a combination of these ideas. A perforated zinc plate 3' 6" \times 6" with holes of $\frac{1}{4}$ inches diameter covers the total inlet opening, allowing total voids equal to 111.3 square inches, or more than sufficient for 4-5 men at 24 square inches per head. But with a really heavy wind this plate does not break up the air current entering a hut sufficiently; hence it will be seen that two wooden valves for the whole length of the flap are superimposed. By use of one or both of these, half or the whole of the perforated zinc can be shut off as desired; with a minimum of trouble the whole arrangement can be put out of action, and the window flap be fully opened. The method has also the virtue of enabling the whole to be fully closed.

The writer placed certain suggestions on the subject before Pioneer Sergt. McLEAVY, R.D.C., whose mechanical instincts enabled him to simplify and cheapen the form originally excogitated. Hence the identifying name of the mechanism.

In the opinion of the writer, this simple and cheap arrangement in public wooden buildings in the tropics would often prove of much utility during monsoon weather, in securing ventilation under conditions appropriate as to wind and wind driven rain.

VITAL STATISTICS.

INDIAN BIRTH RATES.

The Sanitary Commissioner for the Government of Madras, in his Report for 1916, quotes the following as the recorded provincial birth rates per mille in India for that year :—

Punjab	45·6	Burma	33·7
Central Provinces	43·9	Madras	32·5
United Provinces	43·1	Bengal	31·9
Bihar and Orissa	36·6	Assam	30·5

DEATH RATES IN INDIAN PRISONS.

According to the Report on the Jail Administration of the Province of Assam for 1917, the following were the death rates per mille in the Prisons of the various Provinces :—

Assam	13·23	Bombay	18·70
United Provinces	13·24	Burma	19·00
Madras	15·49	Punjab	26·66
		North West Fron-	
Bengal	16·00	tier Province ..	27·29
Central Provinces	18·12	Bihar and Grissa	32·9

GRENADA.

In his Annual Report, the Registrar-General (Dr. Herbert FERGUSON) records for Grenada the birth rate, for 1917, of 34·90 and the death-rate of 21·2. In this Report, the importance which welfare of the infant population must occupy in communities is demonstrated. He shows that of the total mortality 42·9 per cent. was due to deaths of infants below 2 years of age. Thus he ascribes generally to the increased cost of living, and specially to a "steady tendency to establish permanent cultivation whenever possible, with the corresponding result that less land is available for annual crops or pasturage." This he contends has brought about "increasing shortage of milk." Using only statistics of West Indian Colonies having a common basis of comparison, he is able to show that whilst in Trinidad, Jamaica and Bahamas "the death percentage" for infants below ten years of age [presumably of the estimated population of that age] is respectively 5·7, 9·1 and 2·4 in Grenada it amounts to 21·3 per cent. With these facts on record, he is able to make the following useful deductions :—

"Once the tender years of childhood are past, the mortality becomes very low, the rates from youth to advanced age being much below those of other West Indian Colonies. The deduction to be drawn is that, apart from morbidity due to insufficient or unsuitable food and want of care in the case of the young, the climate of Grenada is extremely healthy; and it would seem that if steps were taken to ameliorate the conditions affecting the very young, the death rate of the Colony would be greatly diminished."

PAPUA.

The Annual Report of the Chief Medical and Health Officer (Dr. STRONG), Papua, for 1916-17, is embodied in that of the Lt.-Governor for that period.

The European population amounts to 1,036 ; the coloured indigenous population is not yet sufficiently amenable to discipline to warrant any hope of their numbers being ascertained for some years to come. The nature of diseases to which they are subject can only be judged by the treatment of the more civilized members at hospitals at official head quarters. Dr. STRONG reports as to Europeans a death-rate of 22·2 per mille ; as to natives, he is able to quote statistical results from the village at Port Moresby. This possesses a population of 1,655. Here the birth-rate was 53 and the death-rate 36 per mille.

Of a total of 131 admitted into two hospitals for Europeans, 32 were cases of malaria, 5 of blackwater fever and 18 of dengue. Of 1,053 cases admitted to the Native hospital, 104 were for malaria, 151 for ulcerated mouth (scurvy), 5 for phthisis, 132 for "simple ulcers," and 64 for beriberi. Dr. STRONG however remarks that "venereal disease is perhaps the most serious trouble which threatens the natives of the Territory." As to beriberi, he has urged employers of labour to use undermilled rice.

JAPAN.

K. MIYAIRI, in a paper embodied in the *Korea Medical Society Journal* (No. 19 of 1917) entitled "Public Health Investigation in Japan," affords the following mortality rates, according to age population as ascertained for the whole country, for a Province, and a village, respectively.

Mortality Table for Japan.

Male.				Female.		
Age.	All Japan.	Yamanashi Province.	Unit Village.	All Japan.	Yamanashi Province.	Unit Village.
5-10	2·56	2·48	3·03	2·84	2·83	3·30
11-20	4·56	4·56	6·44	6·67	6·68	7·69
21-30	6·16	5·59	7·95	8·51	8·17	9·16
31-50	11·08	11·44	9·47	11·75	12·26	10·99
51-70	21·19	21·41	25·76	16·68	16·77	19·78
Extremes	54·37	54·32	47·35	53·55	53·29	49·08

The author remarks that the total death rate is about three times that of England, France or Germany, that tuberculosis is on the increase instead of decrease as found in these countries, and that infantile mortality which for Japan was 20 years back 110 is now 160. He considers that variation in mortality of closely related areas is not so much to do with the environment of the people as to the irregularity of distribution of the *Schistosomum japonicum*.

Personal examination of considerable numbers of individuals showed that *Strongylus* and *Schistosomum* infected perhaps 25-35 per cent., and *Ascaris* and *Trichuris*, perhaps, 75 per cent. of the population.

BOOK REVIEW.

MODI (Jaising P.) [L.R.C.P. & S. (Edin.), L.F.P.S. (Glasgow)].
Elements of Hygiene and Public Health for the Use of Medical Students and Practitioners. With an Introduction by Lieut.-Col. E. J. O'MEARA [F.R.C.S. (Eng.), D.P.H. (Camb.), I.M.S.].—xiv + 337 pp. Illustrated. 1918. Calcutta & London: Butterworth & Co. [Price Rs.4 net.]

Under the above title, Dr. Rai Bahadur Jaising P. Modi, Lecturer in the Agra Medical School, has published a work "in response to a demand from the Medical Students for a text-book." This, he explains, has been "written mostly in accordance with the syllabus laid down for the qualifying examination of the L.M.P. by the State Board of United Provinces for special medical examinations." As an Appendix, he supplies a series of questions set from time to time at the grade examinations of Sub-Assistant Surgeons, classified under headings referring to Chapters of his book where the respective subjects are dealt with. There is thus afforded a test as to how far the author has been able to meet the demand he considers exists.

In connection with water-supply, the questions are asked—"What measures would you take to protect a water-supply obtained from a well. . . . In Municipal waterworks how is the water purified?" In illustration of the first subject, there is afforded, at p. 261, the plan of a "well properly protected from surrounding contamination." In so far as contamination by soakage from the adjacent area is concerned, it is directed that the "well should be lined all the way, or in any case for the first ten feet from the surface with brick work covered thickly with cement or with stone slabs." No mention is made of the desirability of any form of backing to the stening, or of its appropriate depth. Information as to the second query is found at p. 10, in the form of a plan which exhibits a layer of gravel resting direct upon the solid concrete bottom of a tank having fluted pillars representing the sides. Neither in the text nor in the plan is there afforded any idea as to how passage through the filter is effected, nor any suggestion that regulation of rate of filtration is essential.

A further examination question is—"Describe in detail the domestic purification of water." The student is told (p. 14) that "efficient (*sic*) filters are ordinarily constructed with materials such as charcoal, sand, silicated carbon, porous iron, &c.;" whilst the Pasteur-Chamberlain and Berkefeld filters are thus dismissed:—"One is made of fine porcelain through which water is forced by pressure and the other is made of infusorial earth, both of which act mechanically." Neither precautions necessary in using these nor any account of the *modus operandi* is afforded. In treating of purification by chemicals, it is laid down that "five to six grains of alum are sufficient to add to each gallon of water"; although in the next sentence it is held that alum is "expensive," it is evident the author holds ultra-liberal views as to dosage.

On the subject of ventilation, the examination query occurs—"What do you mean by aspiration and perfiation?" Turning to p. 39 for information on these points, it is found that "aspiration signifies an upward movement of a column of air, for instance through a chimney, creating a temporary vacuum in its rapid ascent which is directly filled in by the column of air from outside." As to perfiation, it is stated this "means that the wind passes freely from one side to the other through open doors and windows. This method is objectionable on account of the uncertainty of the wind." It is certainly difficult to accept the author's definition of aspiration or the unqualified term "objectionable" in respect to perfiation.

On the subject of food, the student receives advice which is likely to be readily followed—"A putrid egg should not be eaten." On the use of antiseptics added to milk the author places it on record that "salicylic

acid, boracic acid, boro-glycerides and sulphurous acid have been recommended as preservatives for milk," but fails to express either approval or disapproval of their employment.

In view of the infrequency of bovine tuberculosis in India, the author's attitude as to the extent to which this disease is a danger to the population is open to doubt. Thus, at p. 74, it is stated, "It should be specially noted that tuberculosis is commonly met with amongst cattle, pigs and poultry, and as it is easily transmissible to the human beings, it is necessary to detect its presence." At p. 80, it is again asserted, "tuberculosis is very common among cows stabled in ill-ventilated sheds and houses; . . . as however tuberculosis is comparatively rare amongst the Indian children, it may reasonably be supposed that the process of boiling it [milk] thoroughly is responsible for this immunity." At p. 221, however, this doctrine no longer appears "reasonably" satisfactory to the author. He conceives that physicians holding this theory "conveniently seem to forget that milk is liable to be contaminated by flies coming from cowsheds after it is boiled, as vessels containing it are, as a rule, kept open : . . and children are also found playing about on the floor in the cowsheds scattered over with cowdung and urine which may have been infected."

Much of the uncertainty likely to be left in the average reader's mind as to the author's views is doubtless due to the necessity for great conciseness in a work on the wide subject of "Hygiene and Public Health" within the compass of 300 pages. In future editions, space for more details on Applied Hygiene might be gained by taking it for granted that the Medical Students addressed are sufficiently acquainted with the etiology of certain diseases to render it unnecessary to enter into many of the items dealt with. In the meantime, the Agra Medical Student possessed of the advantage of attending Dr. Modi's lectures will find in this work an excellent *aide memoire*.

W. G. K.

TROPICAL DISEASES BUREAU

TROPICAL DISEASES
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[No. 5.

YORKE (Warrington). **The Presence of *Entamoeba histolytica* and *E. coli* Cysts in People who have not been out of England.**—*Trans. Soc. Trop. Med. & Hyg.* 1918. July. Vol. 11. No. 8. pp. 291-296.

The examination of 450 soldiers, admitted to hospital for diseases other than dysentery, resulting in the discovery of 7·8 per cent. of carriers of *E. histolytica* cysts, raised the question of the possibility of infection of people who had never left England or Wales. 1,021 civilians and soldiers and 46 lunatics were therefore examined: each case once. The majority of the examinations were made by Messrs. J. R. MATTHEWS and A. Malins SMITH. The results are given in a table, from a consideration of which cases are grouped as follows:

A. Civilians in an ordinary general hospital: of 450 examined, 1·5 per cent. were infected with *E. histolytica* cysts and 6·7 per cent. with *E. coli* cysts.

B. Children under 12 years of age in a children's hospital: of 246 examined 0·8 per cent. were infected with *E. histolytica* cysts and 10·0 with *E. coli* cysts.

C. Army Recruits 18-19 years of age, in a training camp: of 1,021 examined 5·2 per cent. were infected with *E. histolytica* cysts and 17·8 per cent. with *E. coli* cysts.

D. Inmates of a lunatic asylum: of 46 examined 19·5 per cent. were found to be infected with *E. histolytica* cysts and 43·5 per cent. with *E. coli* cysts.

Reasons are given for assuming that the recruits were infected before going to camp.

The author considers that the discovery is of importance to both military and civil bodies; therefore while legislating for returned dysenterics, young recruits and men invalided with diseases other than dysentery should not be ignored.

From the civil standpoint interest lies in the possibility of amoebic dysentery appearing in this country in the future. The disease has hitherto been almost unknown, three authenticated cases only being known to the writer. If the disease is due to recent importation

the discovery would be of much more importance than if it had existed in this country before the war. There is no evidence as to the degree of infection before the war.

During the discussion which followed the reading of this paper, Mr. Clifford DOBELL stated that the results were similar to those originally obtained in London. At the New Zealand General Hospital of 70 men examined who had been admitted for non-dysenteric conditions 15 per cent. were found to be carriers of *E. histolytica* cysts.* He believes that there have been more indigenous cases than we suspect and it is possible that some of these may have been diagnosed ulcerative colitis. He pointed out that as lunatics are often dirty in their habits, therefore the disease if once introduced amongst them would be liable to spread.

Sir William LEISHMAN said that as regards possible practical dangers he was able to state that although men passing *E. histolytica* cysts have probably gone to France in drafts, yet no outbreak on any scale, of amoebic dysentery had occurred in that country.

Dr. BUCHANAN asked whether it would be possible to analyse cases to see whether the incidence of infection is greater where the midden privy system still remains, or amongst those living in a paved and water closeted town. He wished to learn how long an individual remained a carrier with relation to the importance of investigating the whole population.

Dr. LOW wished to know if clinical symptoms had been noticed in any of the cases. He believed that careful examination would show that such cases suffer from symptoms at one time or another.

Professor YORKE in reply said that though some of the cases had had diarrhoea at some time, yet none had given a history of passing blood and mucus. The cases came from many parts of north England and Wales and followed various employments. He considered that it would be advisable to examine the population of a penal settlement, who had been long removed from the society of their fellow men and were living under good hygienic conditions.

F. W. O'Connor

JULIO LEZACA (Carlos). *Colitis amibiana y disenteria amibiana.* [Amoebic Colitis and Amoebic Dysentery.]—*Repert. de Med. y Cirug.* 1918. May. Vol. 9. No. 8. (No. 104). pp. 440-445.

The author of this paper does not define very clearly the distinction which is to be made between amoebic colitis and amoebic dysentery, unless it be that in the latter the stools are bloody, and the event possibly fatal. The main point of the paper is that slight cases of amoebic colitis, or dysentery, are frequently mistaken for mucos-membranous colitis, and wrongly treated accordingly. A microscopic examination of the stools and a trial of emetine clear up the error at once.

J. B. Nias.

* See this *Bulletin*, Vol. 9, p. 178, where the percentage is erroneously given as 1.5.

FLU (P. C.). *Onderzoekingen over de verbreiding van darmparasieten en wel in het bijzonder van de tetragena-amoëbe en hare cysten onder de bewoners der kampongs van Batavia.* [An Investigation into the Frequency of Intestinal Parasites and Especially of *Amoeba tetragena* and its Cysts among Inhabitants of the Native Quarter of Batavia.]—*Genesesk. Tijdschr. v. Nederl-Indië.* 1918. Vol. 58. No. 1. pp. 216-219.

The stools of 941 healthy natives were examined for various parasites with the result that "*Entamoeba tetragena*" was found to be present in 10 per cent. The author, having pointed out in a previous paper that flies can suck up and carry Amoeba cysts, and void them again with their excrements, thinks this result important, as indicating a possible source of infection.

J. R. N.

VINSON (L.). *Contribution à l'étude de la dysenterie amibienne et de son traitement.*—*Bull. Soc. Méd. de l'Île Maurice.* 1917. May-Dec. Vol. 34. 3. Ser. No. 43. pp. 83-95.

The author of this paper expresses great scepticism on the subject of the differentiation of the intestinal amoebae of man. He is no believer in the possibility of differentiating *E. histolytica* and *E. coli* by any means; neither the vegetative forms nor the cysts can be diagnosed. It causes him little astonishment therefore that every day a new species is discovered, and that such names as *E. quadrigena*, *E. minuta*, *E. nana*, *E. undulans*, *E. Miurai* etc., are proposed for minor varieties of what is in all probability a single parasite. In his opinion the whole question of amoebic dysentery must be revised with the idea in our mind that very numerous modifications in size, shape and pathogenicity of the amoebae may arise, depending entirely on the surroundings in which it finds itself. Tropical amoebic dysentery is only "tropical" because temperature, unsuitable diet, and other factors favour the development of the amoeba, and it is only in people from the tropics that amoebae as a cause of dysentery have been sought in the past. He refers to the suddenness with which symptoms sometimes present themselves and quotes a case in which severe dysentery with amoebae in the stools followed at once after the patient had taken during hot weather a long drink of iced soda. A year afterwards the same person, who had no symptoms meanwhile, had a similar attack after eating non-fresh fish. He concludes that in each of these attacks the amoebae were not introduced from without but that they were present all the time in the bowel and were enabled to become virulent owing to the intestinal derangement caused by the errors of diet.

B. Blacklock.

BARNES (Milford Edwin) & CORT (Edwin Charles). *Oil of Chenopodium in the Treatment of Amœbic Dysentery. Preliminary Report.*—*Jl. Amer. Med. Assoc.* 1918. Aug. 3. Vol. 71. No. 5. pp. 350-352.

The work was done at the Chiangmai Hospital, Siam, in conjunction with investigations on ankylostomiasis. The authors treated a number

[not stated] of cases of acute amoebic dysentery with oil of chenopodium which was administered in one of the following ways.

- (1) A preliminary dose of Mag. Sulph. $\frac{3}{4}$ fs. was given.
2 hours later 1 cc. of oil of chenopodium in capsule.
1 hour later a similar dose of the oil.
1 hour later $1\frac{1}{2}$ oz. of Ol. ricini.
- (2) For more severe cases the preliminary saline was omitted and 2 cc. of oil of chenopodium in $1\frac{1}{2}$ oz. of Ol. ric. was given in a single dose.
- (3) Oil of chenopodium 1 cc. emulsified with gum acacia was administered per rectum. In such cases the anal mucosa was protected by "petrolatum" and the injections were terminated with 2 oz. of an inert oil. The buttocks were elevated and the enema—the first dose of which did not exceed 8 oz. for an adult—was given slowly.

Whichever method was used, improvement was noticed in a few days, blood and mucus generally disappearing on the second day. In a few cases improvement was not evident or was only temporary. Sixteen cases are described of which 2 were primary infections (?), 6 were relapses following emetine treatment, 2 were carriers passing cysts, and three were cases which failed to respond favourably to the authors' treatment. These last make a high percentage of relapses. None of the other cases were controlled microscopically for more than a fortnight. [There is therefore no guarantee that the patients' amoebae were finally destroyed, or that oil of chenopodium has any specific action upon *E. histolytica* infections.]

F. W. O'C.

HEIM (F.). *Le salvarsan peut-il remplacer l'émétine dans le traitement de la dysenterie amibienne?* —*Cor.-Bl. f. Schweiz. Aerzte.* 1918. Mar. 2. Vol. 48. No 9. pp. 282-293. With 4 curves.

The author has tried the effect of salvarsan rectally and intravenously in a few cases of intractable amoebic dysentery with and without liver complications. The conclusions sufficiently represent the author's deductions from his cases.

"(1) Cases of amoebic dysentery occur in which salvarsan proves superior to emetine, in other cases emetine proves more efficacious.

"(2) The variable action of the two drugs depends on several little understood conditions, of which the chief appears to lie in the difference of the clinical forms of the disease: salvarsan is probably more effective in the purely intestinal form, it is certainly less active in the case where hepato-bronchial complications exist.

"(3) In using salvarsan the rectal method should first be tried, and the intravenous only in cases where the amoeba has extended beyond the large intestine.

"(4) Preferably one drug should be used at a time, combined therapy being reserved for very refractory cases.

"(5) Dysentery tends to relapse and to spread and should be treated as rigidly as typhoid or diphtheria. Every carrier of amoebae should be closely observed and treated even when he presents no active sign of disease."

B. B.

LAMBERT (A. C.). Notes on the Treatment of Amoebic Dysentery with Emetine and Bismuth Iodide.—*Jl. Roy. Army Med. Corps.* 1918. July. Vol. 31. No. 1. pp. 79-83.

The treatment by means of "emetine and bismuth iodide" (=emetine bismuthous iodide) alone or in conjunction with emetine hydrochloride (hypodermically) of 40 cases of amoebic dysentery occurring amongst Indians is considered; special attention being paid to the following points:—

1. The tendency, or otherwise, of the drug to cause vomiting.
2. Its action, either when given alone, or in conjunction with emetin hydrochloride hypodermically, in
 - a. Acute cases showing active amoeboid forms in the stools.
 - b. Less acute cases in which encysting forms are appearing in the stools.
 - c. Chronic relapsing cases.

Keratin coated capsules not being available, the powder or freshly made pills were used. Three grain doses of emetine bismuth iodide were not exceeded, and 4 grains was the largest amount ever given *per diem*. The Indians tolerated the treatment well and showed little or no tendency to vomit. —4

In acute cases the best results were obtained from the administration of 2 grains of emetine bismuth iodide at night and one grain of emetine hydrochloride in the morning till 12 grains of emetine hydrochloride and 28 grains of the double iodide had been taken. The tendency to constipation was less than that "which so frequently follows the use of emetine alone."

Subacute cases were treated with 2 grains of emetine bismuth iodide in pill, at night and in the morning, with an occasional dose of half an ounce of sulphate of soda. The treatment continued till 36-40 grains of the double iodide had been taken.

Chronic relapsing cases furnished 4 deaths recorded in the series; two of these terminated in perforation and two were complicated by hyperpyrexia due to heat. Emetine hydrochloride was given hypodermically twice daily in $\frac{1}{2}$ -1 gr. doses. When improvement was noted one or 2 grains of the double iodide was substituted for one of the injections. Morphia was given to allay pain and tenesmus and to promote sleep.

Five cases are described to illustrate the results of the different treatments. Improvement followed in these cases and the stools which were examined microscopically were not found to contain amoebae or cysts. It is unfortunately not stated for how long controls were carried out after treatment was discontinued.

F. W. O'C.

ZAPATA (Ricardo). Algunas consideraciones sobre amibiiasis intestinal. Toxicidad del clorhidrato de emetina. [Remarks on Intestinal Amoebiasis. Toxicity of Emetine.] -*Repert. de Med. y Cirug.* 1918. June. Vol. 9. No. 9. (No. 105). pp. 485-492.

A review of reported cases of emetine poisoning, with particulars of a case occurring in the practice of the author.

The patient, a woman, received a daily dose of 5 centigrammes of chlorhydrate of emetine for 5 days in succession, for symptoms of amoebiasis. The treatment was then suspended for a period of 5 days, during which interval the patient took by the mouth a single dose of 1 gramme of ipecacuanha. The injections of emetine were then resumed for another period of 5 days, in the same dose as before. After this, as no improvement had taken place, a second dose of 2 grammes of ipecacuanha was given. This produced toxic symptoms, consisting of tachycardia, fall of blood-pressure, paralysis of the muscles of the neck and of respiration, and difficulty in swallowing. The symptoms subsided on suspending the medication.

J. B. N.

LOVE (R. J. McNeill). Amoebic Abscess of the Liver.—*Brit. Med. Jl.* 1918. June 22. pp. 696–697. With 1 chart.

In this paper the author gives an account of his experience of amoebic abscess of the liver in Mesopotamia, and draws attention to the fact that in cases in which there are not well marked symptoms it may be very easy to overlook the existence of the condition. He has had experience of twenty cases in his hospital, besides many others already treated and passing through in various stages of convalescence. He makes remarks upon the chief signs and symptoms which may occur, the course of the disease, treatment, and prognosis. Stress is laid upon the suddenness with which symptoms may develop in apparently healthy men, and upon the occurrence of multiple abscesses. The following is the summary of the author's twenty cases.

Apparently cured and patient evacuated *	8
One or more abscesses drained at operation, but further abscesses found <i>post-mortem</i> ..	8
Abscess suspected, undiscovered on needling, found <i>post-mortem</i> to be in the Spigelian lobe	1
Two abscesses, one of which ruptured into the inferior vena cava; death from haemorrhage ..	1
Death due to post-operative shock (no other abscesses)	1
Single abscess drained, but patient did not respond and died seventeen days later from asthenia	1
Apparently cured	7
Minimum mortality, 65 per cent.	

B. B.

STOUT (T. D. M.) & FENWICK (D. E.). A Case of Amoebic Abscess of the Liver and Brain with no Previous History of Dysentery.—*Lancet.* 1918. June 1. p. 769.

A patient who had no dysentery was operated upon for a liver abscess. Pus obtained at the time of operation was examined bacteriologically with a negative result. Cultures were sterile. "A specimen of pus from the discharge three days later was found to

* One of these cases subsequently died at another hospital from a second abscess.

contain motile *Entamoeba histolytica*. The *Entamoeba* or cysts have been found in every subsequent examination. There has been no bacterial growth from the pus." The result of operation was good as regards the immediate relief, but in spite of emetine 1 gr. per day hypodermically for 14 days, the temperature remained and also the entamoebae. The patient died and an abscess of the frontal lobe was found, of the size of a pigeon's egg. The pus was thin and yellow and contained motile *E. histolytica*. [This is, so far as the reviewer is aware, the first record of cysts of *E. histolytica* being found in liver abscess pus. For other records of Amoebic abscess of the brain see this *Bulletin*, Vol. 1. p. 460, and Vol. 3, p. 68-69.]

B. B.

SMITH (A. Malins). **Measurements of and Observations upon the Cysts of *Entamoeba histolytica* and *Entamoeba coli*.**—*Ann Trop. Med. & Parasit.* 1918. July 25. Vol. 12. No. 1. pp. 27-69. With 8 charts.

This work includes a consideration of the measurements of 2,833 cysts of *Entamoeba histolytica* and *Entamoeba coli* found in 80 cases, as well as observations on the nuclei, cytoplasm, "Chromidia," vacuoles and walls of the cysts. The results of measurements are set down in tables and curves. The size of cysts alone is not considered sufficient for diagnosis, which the author believes depends more on other differentiating characters described in detail.

For *Entamoeba histolytica* cysts, extreme measurements recorded are 5.5μ and 18μ . The curve is bi-modal. The first part, with mode at 7.1μ , contains 193 cysts with an average diameter of 7.68μ ; the second part, with mode at 12.2μ , contains 807 cysts with an average diameter at 12.58μ . From the curve the writer concludes that there are two strains differing only in size and named by him the "Ordinary strain" and the "Small strain." 50 was the largest number of cysts examined at a time in making these observations. Infections in men who have never left England and who have never had dysentery are stated to be "prevalingly of the smaller-sized cysts" of the "ordinary strain."

The curve of *Entamoeba coli* is shown to be uni-modal with mode at 16.25μ to 17.1μ , with centre at 16.7 . Extreme measurements are given at 12.5μ and 27.5μ .

By a study of the overlapping of the curves it is believed that cysts measuring from 11.20μ cannot be diagnosed on size alone although cysts below 13μ are probably *histolytica* and those above 15.5μ are generally *coli*; the chances being even for cysts of 14.3μ .

Differences of 0.5μ and 0.8μ in asymmetry of cysts were commonly observed; the maximum difference 9μ in long and short diameters occurred in *E. coli*; 7μ being the maximum noted for *histolytica*. Of 1,233 *histolytica* cysts observed 21 per cent. were asymmetrical and of 1,170 *coli* 16.5 per cent.

Estimations of the numbers of nuclei in cysts showed that in *histolytica* 4 nuclei were present in more than half of the cysts examined; uninucleate forms occurring next in frequency. In *Entamoeba coli* there was an enormous preponderance of 8-nuclear cysts.

Chromatoid bodies were more prevalent in *histolytica* than *coli*.

cysts, being seen in 27 per cent. of 1,162 *histolytica* and in only 5 per cent. of 1,240 *coli* cysts observed. The writer does not believe that they tend to disappear as the cyst matures. All the *coli* cysts containing chromatoids except one were 8-nuclear forms.

In one *Entamoeba coli* cyst infection in which cysts averaged 17μ in size treatment with emetine bismuth iodide caused a temporary disappearance of the cysts; when these subsequently reappeared their average size was 20μ and they were more irregular in shape than before the treatment. [Little importance can be attached to these numbers, however, as they are based upon measurements of only 14 and 20 cysts respectively.]

A summary of the work done and the conclusions arrived at are given and the paper concludes with a consideration of the work published by other observers.

The paper contains useful information in connection with the morphology of the Entamoebic cysts and it should be especially interesting to workers engaged in the study of "Cyst-Strains."

F. W. O'C.

BRUG (S. L.). Some 'Critical Remarks,' on 'A Study of Entamoebic Cysts by Capt. R. Knowles and Capt. A. F. Cole' (*Indian Journal of Medical Research*. Vol. 4, 1917, p. 498).—*Indian Jl. Med. Res.* 1918. Jan. Vol. 5. No. 3. pp. 491-496.

The author takes exception to various statements made by KNOWLES and COLE [see this *Bulletin*, Vol. 10, p. 131], with regard to the confusion which these observers discover in the literature on human Entamoebae. He considers that they exaggerate in speaking of a "chaotic" state. From a study of the results which they published Brug comes to the conclusion that they were dealing with *coli* cysts, and finds no justification for their concluding that *E. coli* and *E. histolytica* are one parasite. The technique of KNOWLES and COLE is criticized, and Brug remarks that "probably amoeboid vegetative forms have been counted as precysts or mononucleates, which may explain the preponderance of this phase in most of the series."

B. B.

CUTLER (D. W.). A Method for the Cultivation of *Entamoeba histolytica*. (Preliminary Note.)—*Jl. Path. & Bact.* 1918. Vol. 22. No. 1. pp. 22-27. With 1 plate.

VEDDER in 1912 [this *Bulletin*, Vol. 1, p. 175] when studying the action of emetine and cephaelin on amoebae was unable to procure a culture of *Entamoeba histolytica* with which to carry out the experiments, and was compelled to have recourse to a culture of amoebae from tapwater. In the same year GAUDUCHEAU (*Ibid.*, p. 181) claimed to have cultured an amoeba from dysentery and liver abscess; while CRAIG (*Ibid.*, p. 179) stated that all cultivated amoebae have nothing to do with the production of dysentery, an attitude which he has since maintained. (*Ibid.*, p. 463 and Vol. 2, p. 387.)

WILLIAMS and CALKINS in 1913, in writing of a strain of culturable amoebae received from MUSGRAVE, state that such variation in the amoebic nucleus could occur that the *limax* type and also the *histolytica* type could be found in the same strain. (Vol. 3, p. 79.) WALKER

and SELLARDS in their well known experiments carried out in 1913 concluded that water amoebae which could be cultivated were capable of parasitizing man but were not pathogenic; whereas pathogenic amoebae were not cultivable. COURET and WALKER (*Ibid.*, p. 80) reported the cultivation on autolysed tissue of the amoeba from a liver abscess. BOURRET, WHITMORE, KUMAGAWA and MATHIS failed to cultivate pathogenic amoebae. ROSS and THOMSON (*Ibid.*, Vol. 7, p. 195) cultivated *A. limax* but not pathogenic amoebae from sand on which pathogenic amoebae had been deposited, and PENFOLD, WOODCOCK and DREW were able to obtain partial development from cysts of *E. histolytica* subjected to the action of pancreatic juice (*Ibid.*, Vol. 8, p. 116).

The above brief and incomplete summary is necessary in order to gauge the importance of the paper under review. Cutler's results are convincing to an extent which cannot be claimed for some of the previously reported successful cultures of pathogenic amoebae. On six occasions out of forty-five attempts he obtained a culture of *E. histolytica*. His technique is given *in extenso* so that other workers may repeat if possible the successful results he has obtained.

" Media employed.

" Preliminary attempts were made with Musgrave & Clegg's medium, with ordinary agar, the reaction of which was made to vary from -20 to +10 (Eyre's scale), with blood-smear agar and other media recommended for the cultivation of parasitic amoebae. In addition, many of the media in common use in bacteriological laboratories were tried.

" *Egg Medium.* Successful cultures were obtained with an egg medium described by Dean and Mouat (1916), to which it is advisable to add a few drops of blood. The medium is prepared as follows. The white and yolk of one egg are thoroughly broken up by shaking in a glass bottle containing glass beads. The substance should be thoroughly shaken so as to ensure that the egg is broken up into small particles. To this is added 300 c.c. of distilled water, and the mixture is shaken once more. The mixture is now gradually brought to the boiling-point by placing the bottle in a water bath, and the temperature is maintained for half an hour. During the whole process the mixture is constantly and violently shaken. The result is a fluid in which the egg particles are suspended. The medium is distributed in suitable quantities (5 c.c.) into test tubes, which are sterilised in the autoclave.

" *Blood-Clot Medium.* This is prepared by taking 500 c.c. of human blood clot and boiling it for an hour in a litre of water. To the filtrate is added 0.5 per cent. sodium chloride and 1 per cent. peptone. The medium is then tubed and sterilised by steaming for twenty minutes on three successive days. A few drops of blood are added before use, as with the egg-broth medium.

" The early experiments were carried out with egg broth, and with the exception of culture 4, all the cultures used for the infection of cats were prepared on this medium. Subsequent work has demonstrated, however, that the blood-clot medium produces equally satisfactory growths of the amoebae, and it has the great advantage of being perfectly clear. On numerous occasions amoebae have survived in culture for several days, but have died within the first week.

" Method of obtaining Cultures.

" All the successful cultures were obtained from specimens consisting of blood and mucus, and a specimen of this type is probably desirable, if not essential to success.

"The cultures were made not more than three hours after the specimens had been passed. A small quantity of the faeces (five or six large loopfuls) was inoculated into a tube containing 5 c.c. of the medium to which a few drops of fresh blood had been added. The cultures were incubated for twenty-four hours, at the end of which time a microscopical examination was made. In the early part of the work the incubator temperature was 37° C., but latterly it has been found that a temperature of 28° to 36° C. is sufficient. This lower temperature is an advantage in checking the excessive growth of bacteria, which soon render the medium unsuitable for the development of the amoebae. In successful experiments amoebae were found in such numbers at the end of twenty-four hours' incubation that it may be assumed that multiplication had taken place in the culture medium.

"Maintenance in Sub-culture.

"It is necessary to sub-culture frequently, daily is often desirable, as there is a tendency for the amoebae to pass into the cyst condition if not removed to a fresh medium. Also it is advisable to test the reaction of the culture daily, as acidity soon kills the amoebae. If, however, the medium has not been rendered markedly acid by the bacteria, a sub culture need not be made for two or three days.

"In order to make a sub-culture, 0.5 to 1 c.c. of the medium containing the amoebae is inoculated into a fresh culture tube, which is incubated

The history of the six cultures which have been obtained is as follows :—

"*Culture 1.* This culture was started on 18th March 1917. The faeces of the patient (G.) from which the culture was isolated contained large numbers of amoebae, but no cysts were found after repeated microscopical examination. The culture medium employed was egg broth, and sub-cultures were made every two to three days for the first six weeks. Afterwards it was found advisable to make sub-cultures more frequently, and this has been done daily. For the past six weeks the blood-clot medium has been used with equally good results. The culture is still alive at the time of writing. The history of the man gave no evidence of his having been treated with emetine.

"*Culture 2.* This culture was obtained at the beginning of June 1917. It was started from the faeces of the same patient as culture 1, but the man, during the interval, had been treated with emetine hypodermically and with bismuth emetine iodide. Egg broth was the medium used, and sub-cultures were made daily. For six weeks active amoebae were observed at the microscopical examinations, but at the end of this period cysts began to appear in great numbers, and in spite of repeated sub-culturing all the amoebae either passed into the cyst condition or died. It is probable, from the number of cysts seen, that only a small number of the active forms died.

"*Culture 3.* This culture was isolated from patient (B.) during the first week of July 1917. The stool contained much blood and mucus. As in the above cases the medium employed was egg broth, and sub-culturing was continued in the usual way. At the end of four weeks numbers of cysts appeared in the cultures, and finally all vegetative forms disappeared.

"*Culture 4.* This culture was obtained from the same source as culture 3, but a week later. In this case the blood-clot medium was used. The history of the culture is similar to that of the two preceding experiments, except that excessive cyst formation commenced earlier—three weeks after the beginning of the experiment; so that, as far as active amoebae were concerned, the culture died three weeks after it had been started.

"*Culture 5.* Early in May 1917 amoebae were obtained from the faeces of patient (D.), who had been treated with 36 grs. of bismuth emetine iodide. The culture was made in the egg-broth medium. After three weeks' subculturing the parasites began to die, and finally all disappeared.

"*Culture 6.* This last culture was made from the faeces of a cat that had died from the inoculation of cysts obtained from culture 1. The culture was started on egg-broth on 7th July 1917. Three sub-cultures

were made into this medium, and then the culture was inoculated into the blood-clot broth, into which sub-cultures were made for twenty-six days, after which period the culture died out."

The author gives a description of the amoebae in culture with a section on cyst formation. Inoculation experiments on cats were carried out, the faeces of the experimental animals being previously examined daily for a fortnight and found negative. The general results are expressed thus in a very brief summary:—

"A method is described by which *E. histolytica* can be maintained in culture for several months. These cultures, if inoculated into cats, produce dysenteric lesions of the intestines."

Figures of the amoebae and cysts are given and also a photograph of the intestinal lesion in one of the cats which was infected by ingestion of cyst containing culture material.

[It is impossible to overrate the importance of Cutler's paper as a contribution to the subject of amoebic dysentery. It may be argued that the author has obtained a culture of a non-pathogenic form of amoebae. If so, then he has opened up afresh the whole question of the morphology of the intestinal amoebae of man, because his figures are not to be distinguished from *E. histolytica*. If, on the other hand, Cutler has discovered a means of cultivating pathogenic amoebae, he has thereby contributed the most important advance in the subject which has been made since the work of WALKER and SELLARDS (this *Bulletin*, Vol. 3, p. 63).]

B. B.

FIGORE (Gennaro) & BARTOLINI (Alceste). Criteri pratici per la diagnosi microscopica della dissenteria amebica.—*Giorn. di Med. Milit.* 1918. Apr. 30. Vol. 67. No. 4. pp. 301-309.

This paper contains nothing to which attention need be called. It gives a fair general account of the technique and methods of diagnosis employed in cases of suspected amebiasis.

B. B.

SCHOEPPFLER (Hermann). Ueber einen Fall von Amöbendysenterie.—*Cent. f. Bakt.* 1. Abt. Orig. 1918. Apr. 23. Vol. 81. No. 3. pp. 192-196.

This is an account of the post mortem examination of a woman who had died, the case having been diagnosed as cholera. Details of the pathological findings are given. The condition was due to amoebic infection, and no other organism could be isolated.

B. B.

BACILLARY DYSENTERY.

BUCHANAN (G. S.). Study of an Outbreak of Bacillary Dysentery.—*Lancet.* 1918. Aug. 10. pp. 166-168.

An outbreak of dysentery occurred in December and January last in an institution in the eastern counties of England which was built as a local workhouse and occupied by men engaged mainly in agricultural work in the neighbourhood. 38 cases were noted with two deaths.

The main features of the epidemic were: (a) sudden onset and brief duration; (b) evidence of water-borne infection; (c) the infecting

agent was B. Shiga ; (d) evidence of the persistence of the Shiga bacillus when experimentally produced into water and food ; (e) results of agglutination tests applied to dysentery convalescents and to those who had presumably been exposed to infection but had escaped illness.

The agglutinations were done by DREYER's method with standard agglutinable cultures of *B. dysenteriae* Shiga. In every one of the 35 cases in which the blood could be examined a positive agglutination reaction was obtained in high dilution. In 21 out of 114 men (= 18 per cent.) who had not suffered from dysentery well marked agglutination was observed though the agglutination titre was lower than that of the actual patients.

As an explanation of these results it is suggested that the 18 per cent. of the healthy men at the institution had acquired the ability to agglutinate B. Shiga as a result of exposure to the same infection which had produced dysentery in the 38 men affected—presumably the infected water supply. But in the case of this 18 per cent., either because the local multiplication of the bacilli after infection was insufficient or because of the existence of some factor of insusceptibility in the men, no symptoms were produced.

F. E. Taylor.

NOLF (P.), COLARD (A.), DULJÈRE (A.) & ROSKAM (J.). *L'Epidémie de Dysenterie bacillaire de 1917 au front belge.*—*Arch. Méd. Belges.* 1918. May. Vol. 71. No. 5. pp. 521-539. With 1 chart.

Nolf and his fellow workers state that during 1915 and 1916 bacillary dysentery existed to only a feeble extent on the Belgian front. In 1917 it assumed epidemic proportions, more than 1,200 cases occurring in five months. The epidemic commenced in August, reached its climax in September and October and then rapidly disappeared with the advent of cold weather and the disappearance of flies, which were considered to be the disseminators of the infective micro-organisms.

In addition to slight forms with diarrhoea of a few days' duration, the cases presented two fairly defined groups: the one of moderate intensity very widely distributed, the other of great severity, less frequently encountered, and presenting signs of rapid dehydration. In a fourth category were placed cases evolving with extreme slowness, presenting sequelae difficult to cure and resulting in chronic forms of dysentery.

The complications were rare and in general benign. In some cases, even of moderate severity, peritoneal symptoms, suggesting appendicitis complicated by general peritonitis, were observed. Extra-intestinal complications included herpes labialis and nasal herpes, transitory conjunctival and ciliary injection (twenty cases), and serpiginous ulceration of the cornea (once). Coli bacilluria was twice observed. Nervous sequelae were vaso-motor disturbances and transitory neuralgias, chiefly of the sciatic and trigeminal nerves. Muscular pains and arthritis were also noted. In one case of recurrent polyarthritis the puncture fluid was sterile and agglutinated Flexner and Y bacilli in the same titre as the blood serum.

The mortality was extremely low, only three deaths occurring or a percentage of 0.25, owing probably to the predominance of Flexner

and Y bacillus infections. Positive agglutination reactions were obtained 1,044 times, of which 991 were Flexner or Y bacillus or both, and 12 were Shiga's bacillus; 176 cases gave negative agglutination reactions though many of these were undoubtedly dysentery, clinically considered. With regard to treatment some of the severe cases received subcutaneous or intravenous injections of the Pasteur Institute polyvalent antidysenteric serum up to a total of 400 cc. but without any strikingly beneficial effect. The symptoms of serum disease—fever, urticaria and arthralgia—were observed in many of these cases. Intravenous injections of peptone gave no better results, and intravenous injections of saline produced only temporary benefit.

F. E. T.

VON CRIEGERN (L.). **Erfahrungen bei der Ruhrepidemie in Hildesheim.** [Experiences of an Epidemic of Dysentery in Hildesheim.] *Forischr. d. Med.* 1917-18. Dec. 10. Vol. 35. No. 6-7. pp. 41-46.

Von Criegern relates his experiences of an epidemic of bacillary dysentery at Hildesheim [near Hanover]. There were 72 cases with 13 deaths, giving a mortality of 15 [? 18] per cent. Of the 13 deaths 7 occurred in children aged four and under, and 2 in persons over 58 years of age. 74 samples of stools from undoubted dysentery cases were sent for bacteriological examination to the Hygiene Institute at Göttingen and on only three occasions were dysentery bacilli found. Hence, for practical purposes he considers that bacteriological examination of the stools serves no useful purpose. As regards the agglutination test 51 positive and 15 negative results were obtained from 66 samples of blood from undoubted dysentery cases.

He considers that examination with the proctoscope, revealing erosions, granulations, ulcerations and necrosis, is of great value both in diagnosis and in prognosis.

Sequelae and complications included psychoses (2 cases), pyoderma, paronychia (2), balanitis (2), herpes labialis (3), erythema exudatione multiforme (1), a rosea-like exanthem (1), conjunctivitis (4), keratitis (2), arthritis (6), in two of which neuritis was also present, lactation (3), stomach troubles (3), heart disease (2), alcoholism (1), pulmonary tuberculosis (3), one of which was complicated by tuberculous pericarditis.

Treatment was entirely symptomatic, consisting of the administration of purgatives, enemata, or astringents as indicated. Serum treatment is not even mentioned.

F. E. T.

SNIJDDERS (E. P.). **Rapport over de Dysenterie-Epidemie in Tanah-Poeth en omgeving, Mei-Augustus 1917.** [Report on an Epidemic of Dysentery at Tanah-Poeth and its Neighbourhood May-August 1917.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1918. Vol. 58. No. 2. pp. 245-282. With 1 map & 1 plan.

A report of a small epidemic of bacillary dysentery of purely local interest. The cases numbered 55, with 32 deaths (58.2 per cent.). Shiga-Kruse bacilli were isolated from 2 cases, and the sera of 10

convalescents gave a high degree of agglutination to the same bacillus. The outbreak was not apparently due to water-infection.

J. B. N.

ESCOMEL (E.). **Première constatation de la Dysenterie bacillaire à Aréquipa, Pérou.**—*Bull. Soc. Path. Exot.* 1918. Apr. Vo. 11. No. 4. pp. 268-271.

In fourteen years' examinations of the stools of dysentery cases in Peru, bacilli have never previously been encountered as the cause of the dysentery. Many forms of protozoa have been found—amoebae, Trichomonas, Lamblia, Tetramitus, Balantidium and spirochaetes. In November 1917 an epidemic of dysentery occurred at Jura, a bathing station situated 28 kilometres from Arequipa, which affected both infants and adults without distinction of sex. Protozoa could not be found in the stools, but innumerable non-motile Gram-negative bacilli were constantly present; on account however of the distance from Arequipa and the reduced train service "by reason of the great war which desolates Europe," cultural and inoculation investigations could not be undertaken.

F. E. T.

BROWNING (C. H.). **The Differentiation of Dysentery Bacilli.** [Correspondence.]—*Lancet.* 1918. May 25. p. 749.

In discussing ANDREWES's paper on the Differentiation of the Dysentery Bacilli [see this *Bulletin*, Vol. 12, p. 16] Browning considers that "there appear to be two questions at issue: (1) Are the Shiga and Flexner types of dysentery bacilli well-defined entities with fermentative and serological characters sufficiently constant to enable them to be identified with a great degree of regularity by competent bacteriologists? and (2), Are the classical types of organisms to be regarded as the sole cause of dysentery of bacillary type?"

It is agreed that the answer to the first question should be in the affirmative. With regard to the second question Browning summarises the conclusions arrived at by Dr. T. J. MACKIE as the result of two years' work in Egypt, the manuscript of which is in Browning's hands and about to be published.

The conclusion is reached by MACKIE that from their occurrence in large numbers in early cases of acute dysentery, in the absence of the classical types and from their characteristic effects in animal experiments (which were found to be similar to those produced with the classical Shiga and Flexner-Y types), together with their close biological similarity to organisms of the typical dysentery group, certain atypical organisms which he found are to be regarded as true dysentery bacilli (in the etiological sense of the term). Browning considers that

"the question remains to be settled whether all or any of those organisms represent specific types which are highly pathogenic and are transmitted from person to person, causing disease in a considerable proportion of those whose intestines they reach, or whether, on the other hand, they are organisms normally present in the intestines of the individual, which in ordinary circumstances are held in check by the common flora, but under conditions not yet understood are capable of replacing the usual coli-types and of initiating lesions. The multiplicity of these organisms,

however, suggests strongly that they do not have the epidemiological significance of the classical Shiga and Flexner-Y types. Hence the prevention of the considerable proportion of cases of dysentery in the east due to those atypical bacilli may present special and peculiar problems."

F. E. T.

- ASCOLI (Alberto). i. *Della diagnosi batteriologica nella dissenteria.*—*Soc. Med. Chirurg. di Modena.* 1918. Apr. 20. *Policlínico.* Sez. Prat. 1918. May 19. Vol. 25. No. 20. pp. 461-466.
---. ii. *Diagnostic bactériologique dans la dysenterie.*—*Presse Méd.* 1918. July 11. Vol. 26. No. 39. pp. 357-359.

In discussing the bacteriological diagnosis of bacillary dysentery Ascoli of the Sero-Therapeutic Institute at Milan draws attention to the fact that in the year 1917 this disease attacked 58,196 persons in Prussia with 7,076 deaths. He considers that the characteristic symptoms of dysentery do not correspond to a uniform bacteriological picture and that war experience has further complicated the bacteriology of bacillary dysentery and has now reduced it to a state of chaos. For example, some outbreaks have been definitely proved to have been due to the recognised types of dysentery bacilli, whilst in other outbreaks only organisms approaching *Bacillus coli* types have been isolated. In consequence of these conflicting findings the German Bureau of Hygiene and Public Health has recently decided that prophylactic measures against dysentery should be determined by the appearance of the dejecta and not on the bacteriological findings. SELIGMANN'S contention that the various dysentery bacilli are derived from a common ancestor, namely *Bacillus coli*, is rejected by Ascoli who considers that the epidemic dysentery of Italy is due to *Bacillus dysenteriae* Shiga.

F. E. T.

- MESSERSCHMIDT. *Die bakteriologische Diagnose und die Benennung der Ruhrbazillen.* [The Bacteriological Diagnosis and Nomenclature of Dysentery Bacilli.]—*Ztschr. f. Hyg. u. Infektionskr.* 1918. Feb. 22. Vol. 85. No. 2. pp. 181-192.

Messerschmidt's experiences were gained in both the eastern and western theatres of war during 1915 and 1916. The diagnosis of dysentery bacilli was made from a study of the following characters:—(1) Typical growth on Endo plates and in litmus milk, glucose agar and litmus mannite agar; (2) absence of motility in bacilli from agar condensation water or from fluid cultures free from bile; and (3) agglutination phenomena. Preliminary agglutination was found to be of little practical value on account of the number of bacilli agglutinating with difficulty or showing para-agglutination. In the third week of the disease Shiga-Kruse bacilli were found to agglutinate powerfully. Less favourable results were obtained with the non-toxin forming dysentery bacilli. Tests were made with serum of the Shiga-Kruse, Flexner, Y. and Strains A. H. and D (Pseudodysentery of KRUSE). Owing to the exigencies of field service, time and opportunity to carry out CASTELLANI'S absorption test [see this *Bulletin*, Vol. 11, p. 451] were lacking.

Messerschmidt criticises the present multiplicity of names of dysentery bacilli, including those of LENTZ and of KRUSE, and pleads for the adoption of a uniform nomenclature.

By surrounding the sick with a circle of prophylactically inoculated individuals the epidemic spread of dysentery may be prevented. A vaccine should be prepared without heat from several locally isolated strains by emulsifying them in .5 per cent. carbol saline. Three injections of 2.5, 5, and 10 millions are given at intervals of 6 days. Only trifling reactions were observed.

F. E. T.

KATHE. Zur Ruhrfrage. [On the Dysentery Problem.]—*Deut. Med. Woch.* 1918. May 2. Vol. 44. No. 18. pp. 488-490.

Kathe considers that the dysentery caused by the non-toxic Flexner-Y types of dysentery bacilli was more widespread in Germany before the war than was commonly supposed, and that this form of dysentery presented the clinical appearance of a slight gastro-intestinal attack, ran an ambulatory course, and so escaped observation and treatment. Dysenteric infection is favoured by errors in diet and by disturbances of the gastro-intestinal functions. In war areas the plague of flies constitutes the chief agent in the dissemination of dysentery. To combat this, closed fly proof latrines should be provided, and these can be used even in the front trenches. He considers that dysentery carriers are suffering from chronic dysentery. For their detection proctoscopy should be employed together with the ordinary bacteriological and serological methods.

F. E. T.

SCHITTENHELM (A.). Ueber bazilläre Ruhr und ihre spezifische Behandlung. [On Bacillary Dysentery and its Specific Treatment.]—*Münch. Med. Woch.* 1918. Apr. 30. Vol. 65. No. 18. pp. 471-473.

When employed sufficiently early serum treatment often diminishes the duration of the disease, prevents a simple attack becoming severe and saves many severe and apparently hopeless cases. Small doses of 20 to 30 cc. of serum are of no value; 50 to 80 cc. according to the severity of the disease should be given daily by intramuscular injection until improvement results, when the dose should be reduced to 40 to 30 cc. for the next two to four days. When antidysenteric serum is not available and also in support of serum therapy, the use of BOEHNCKE'S Dysbakta [see this *Bulletin*, Vol. 12, pp. 20-21] is recommended.

F. E. T.

PFEIFFER. Zur Serumbehandlung der Ruhr. [The Serum Treatment of Dysentery.]—*Deut. Med. Woch.* 1918. June 27. Vol. 44. No. 26. p. 715.

Pfeiffer's experiences were obtained in treating dysentery cases on a large scale with MERCK'S anti-dysenteric serum on the Eastern front from August to October 1917. Small doses were found to be inefficient. Later, 100 cc. were injected intramuscularly in the gluteal

region on each of four, five, or even six successive days, so that a total of from 400 to 600 cc. of serum was given. Apart from transient fever and urticaria no ill effects were seen. In cases treated early very satisfactory results ensued, there being rapid general improvement with disappearance of blood, pus, and mucus from the stools. In severe and chronic cases, however, the results were less manifest. Intravenous injections of 20 cc. were given on three successive days to a few cases, the numbers being too small to warrant any definite conclusions.

F. E. T.

JACOB (L.). Ueber die Behandlung der Ruhr mit polyvalentem Serum.
[On the Treatment of Dysentery with Polyvalent Serum.]—*Münch. Med. Woch.* 1918. June 11. Vol. 65. No. 24. pp. 640-642.

Notwithstanding the fact that several observers have reported favourably on the value of multivalent antidysenteric serum in the treatment of bacillary dysentery, others, like SINGER, have obtained equally good results from the use of normal horse serum, whilst MATTHES obtained favourable results in three cases with tetanus and diphtheria serum.

Jacob administered a multivalent antidysenteric serum either intravenously or subcutaneously to 90 cases, mostly in the first and second weeks of the disease. 32 per cent. of the cases are described as being severe, 50 per cent. moderately severe and 18 per cent. mild. The total amounts administered per patient varied from 20 cc. to 490 cc. Jacob concludes that in the severe and moderately severe cases the injection of serum had no influence on the course of the disease. The number of fatal cases was not diminished. The duration of the disease was not lessened. The various symptoms, such as the quality of the pulse, fever, diarrhoea and tenesmus were no more affected than they are by purely symptomatic treatment. Complications like arthritis were not prevented by the serum, which seemed to have a harmful effect. Mild symptoms of the serum disease, such as exanthemata, occurred in 25 per cent. of the cases, whilst severe and even alarming symptoms such as joint pains, vomiting and high fever occurred in 4 to 5 per cent. Hence the author concludes that care in the dosage is necessary and that intravenous injections should not be given.

F. E. T.

DOBRASHIAN (Gertrude Margaret). An Investigation into the Results from Treatment of Bacillary Dysenteries by Serum and by Salines respectively.—*Jl. Roy. Army Med. Corps.* 1918. Apr. Vol. 30. No. 4. pp. 441-448.

This investigation was undertaken in Malta on 535 cases of bacillary dysentery sent from the Salonica area during 1916.

In spite of the severe type of case treated with serum, the results were vastly superior to those obtained by salines alone, and the figures bring out the importance of early serum treatment. As a preventative of complications and sequelae serum holds an important position. When serum was given early convalescence was rapid and relapses rare.

It was urged that there should be :—

"(1) A more extensive use of anti-dysenteric serum which should be given at the earliest opportunity.

"(2) That doses should be adequate, by that I mean at least 40 cubic centimetres of polyvalent serum, for a case of moderate severity.

"(3) That two, three or even four such doses should be given on consecutive days.

"(4) That at the same time salines by the mouth should be administered frequently, drachm or half drachm doses every hour or every two hours until the stools become faecal, and thereafter in gradually diminishing doses."

F. E. T.

NOWICKI. Ruhrfälle mit dem Nachweise des Erregers ausserhalb des Darmtractus. [Demonstration of Dysentery Bacilli outside the Gut.]—*Berlin. Klin. Woch.* 1917. Dec. 24. Vol. 54. No. 52. pp. 1237-1239.

Although it is usually held that bacterial dysentery is a purely local infection without bacteraemia and without dissemination of the organisms into tissues external to the bowel wall, Nowicki considers that a more systematic investigation would probably show that such dissemination of dysentery bacilli is commoner than is generally supposed. He narrates in detail four cases. In two of them the Shiga-Kruse bacillus was found *post mortem* in the spleen parenchyma and in the spleen parenchyma and heart blood respectively. In the third case the bacillus Y was cultivated *post mortem* from the spleen parenchyma. In the fourth case, one of Flexner's dysentery, scanty colonies of Flexner's bacillus were obtained from the urine during the course of the disease.

F. E. T.

WHITEHEAD (Henry) & KIRKPATRICK (J.). The Isolation of Dysentery Bacilli from the Faeces.—*Lancet.* 1918. Aug. 3. pp. 143-144. With 1 fig.

Whitehead and Kirkpatrick describe what they consider the best method of isolating *B. dysenteriae* from the faeces, by the use of which they have obtained the following results :—

"We have isolated only two *B. dysenteriae* Flexner out of some 5,000 examinations of stools which contained neither pus nor mucus; and never a *B. dysenteriae* Shiga. This shows the futility of examining stools of this character.

"Our findings of the classical types of *B. dysenteriae* in stools containing pus and mucus alone are as follows :—

"200 cases investigated by method described.

"101 typical stools containing pus and mucus. Findings: 46 *B. dysenteriae* Shiga, 30 *B. dysenteriae* Flexner-Y—i.e., 75 per cent. positive results.

"Remaining 99 had not the typical naked-eye appearance, but contained mucus.

"The findings in the 200 cases were: *B. dysenteriae* Shiga, 68; and *B. dysenteriae* Flexner-Y, 41—i.e., 54 per cent. positive results.

"From results obtained we are bound to conclude that the classical types of *B. dysenteriae*—Shiga, Flexner, and Y—are the true causes of bacillary dysentery. The 75 per cent. positive findings in selected cases is surely proof in itself. It is probable that the 25 per cent. negative findings may be explained by (1) specimens collected too long before being

cultured, (2) duration of disease too long, with disappearance or paucity of dysentery bacilli. Moreover, the results fully demonstrate the value of the methods described.

"As regards atypical forms of dysentery bacilli, on which so much work has been done recently, it is more than likely that these are associated organisms and not the true causes of bacillary dysentery. The so-called inagglutinable types of Shiga and of Flexner-Y are often morphologically unlike the classical types, being distinctly smaller and thinner, and the colonies are more "slimy" in character. We have often isolated these types from plates on which the classical types were found, and from many stools apparently normal. In many cases the reaction of the patient's serum has been tried in its effect on these atypical forms with negative results. In no case have we failed to get positive (controlled) reaction when classical types have been isolated, the test being done before any administration of anti-dysenteric serum."

F. E. T.

MARTIN (C. J.) & WILLIAMS (F. E.). **The Chance of recovering Dysentery Bacilli from the Stools according to the Time relapsing since the Onset of the Disease. Experience at a Base Hospital in France.**—*Brit. Med. Jl.* 1918. Apr. 20. pp. 447-448.

From experience of laboratory work gained in the Eastern Mediterranean and in Egypt in 1915 and 1916 the authors came to the conclusion that the chance of recovering dysentery bacilli from the stools after the first few days of the disease was a small one. This was confirmed by their subsequent experiences at a base hospital in France. From June to December 1917 out of 1,050 efforts to recover dysentery bacilli from the stools at various periods of the disease there were 68 per cent. positive results in the first five days, 17.4 per cent. in the second five days, 6.3 per cent. in the third five days and still less subsequently, showing how rapidly the chance of recovering dysentery bacilli diminishes after the first few days, whether the stools remain characteristically dysenteric or not. If reliance had been placed on one examination only 15 per cent. would have been discovered.

The host of intestinal organisms would appear to overwhelm the dysentery bacilli originally present, thus placing a serious limit to the value of the bacteriological diagnosis of dysentery.

F. E. T.

i. MARTIN (C. J.), HARTLEY (P.) & WILLIAMS (F. E.). ii. GARDNER (A. D.). **Agglutination in the Diagnosis of Dysentery.**—*Brit. Med. Jl.* 1918. June 8. pp. 642-644; June 22. p. 710.

i. When the agglutination tests are made with standard agglutinable cultures by DREYER'S method the authors' results indicate that in the case of infections due to *B. dysenteriae* Shiga determination of the agglutinin content of the patient's serum constitutes a valuable method of diagnosis, but that this is far from the case with patients infected by members of the mannite-fermenting group of dysentery bacilli. They found that if the serum of patients who have recently suffered from infection by a member of the Flexner group of dysentery organisms was tested against five strains of the group, the percentage giving a positive result was nearly twice as great as when only one strain was used and they believe that the number yielding a positive

result would be still further increased if the patient's serum were tested against a still greater number of locally isolated strains.

ii. Correcting a statement on Dreyer's standard agglutination method made by MARTIN and his fellow workers, Gardner points out that it is not the behaviour of the culture with any sample of serum that determines its numerical factor of agglutinability, but its behaviour (using *any* serum) as compared with an arbitrarily selected formolized broth culture, which is taken as a standard against the original one. He also points out that it is because formolized cultures possess a very much higher degree of stability than any serum that it is possible to use them as standards.

F. E. T.

FLU (P. C.). Over het voorkomen van agglutininen tegenover Flexner-bacillen in het bloedserum van normale personen in Batavia. [On the Presence of Specific Flexner-Agglutinins in the Blood-Serum of Normal Persons in Batavia.]—*Geneesk. Tijdschr. v. Nederl Indië*. 1918. Vol. 58. No. 1. pp. 207-208.

The author finds that he can confirm SNIJDER's statement that the serum of normal persons, in the Dutch East Indies, will often agglutinate both Flexner and Bacillus Y in dilutions of 1 : 100 or higher, so as to make the reaction practically useless for the detection of latent dysentery.

A number of sera that were being examined at Weltevreden for the Wassermann reaction were simultaneously tested against dysentery bacilli, with the following result:—

No. of sera tested (all from Europeans), 107.

To Flexner.					To Shiga-Kruse.				
Negative	..	..	..	14	Negative	..	..	103	
Positive	1/50	..	..	16	Positive	1/50	..	1	
..	1/75	..	..	11	..	1/100	..	2	
..	1/100	..	..	12	..	1/200	..	1	
..	1/150	..	..	16					
..	1/200	..	..	32					
..	1/300	..	..	2					
..	1/700	..	..	1					
..	1/800	..	..	2					
..	1/900	..	..	1					
<hr/>									
Total				107					

J. B. N.

FLETCHER (William). Preliminary Agglutination in the Isolation of Typhoid and Dysentery Bacilli from the Excreta.—*Jl. Roy. Army Med. Corps*. 1918. May. Vol. 30. No. 5. pp. 500-509. With 5 figs.

In examining excreta for typhoid, paratyphoid and dysentery bacilli Fletcher carries out direct plating on Endo's medium and after enriching with brilliant green.

The "likely" colonies on the plates are tested at once with two combined agglutinating sera: (1) a mixture agglutinating members

of the Eberth group, viz., *B. typhosus*, *B. dysenteriae* Shiga and *B. dysenteriae* Flexner, and (2) a mixture agglutinating bacilli of the Gärtner group, viz., *B. paratyphosus* A, *B. paratyphosus* B and *B. enteritidis* Gärtner.

For further confirmation saturation tests are employed and the cultural characters are investigated. The drawbacks to the method of preliminary agglutination are, (1) Certain non-pathogenic organisms are agglutinated by the specific serum in low dilutions; (2) Some strains of pathogenic organisms are non-agglutinable and escape detection. Its advantages are (1) efficiency, (2) simplicity, (3) speed, (4) economy.

F. E. T.

SMARTT (F. N. B.). **Some Strains of Organisms found in Dysentery Suspect Cases in France, showing Peculiar Agglutinating Phenomena and Sugar Reactions.**—*Jl. Roy. Army Med. Corps.* 1918. Feb. Vol. 30. No. 2. pp. 157-174.

As the result of some months' work at a Base in France Smartt concludes that:—

"(1) Agglutinability alone provides no proof of the specificity of an agglutinating organism which does not conform to cultural tests.

"(2) Diagnosis dependent on agglutination tests only is not applicable to carriers for the reason that a large number of positives will be returned on totally inadequate bacteriological grounds.

"(3) Should the suggestion that the agglutinability of heterologous bacteria affords proof of specific infection be confirmed and controlled by further observations, it may become possible to diagnose infection from the examination of bacteria in mixture from plate cultures."

F. E. T.

GRUBER (G. B.) & SCHAEDEL (Albert). **Agglutination mit Leichen-serum, ein Beitrag zur Frage der Ruhrdiagnose.** [Agglutination with Corpse Serum, a Contribution to the Problem of Dysentery Diagnosis.]—*Cent. f. Bakt.* 1. Abt. Orig. 1918. May 31. Vol. 81. No. 4-5. pp. 236-243.

The agglutinating power of the serum of the cadaver, in cases dying both from dysentery and from other intestinal diseases, was investigated by the authors, who found a positive agglutination in 1 in 200 and upwards in the former class and in 1 in 40 or less in the latter. Their results did not permit them to differentiate infections by the various dysentery organisms by this method.

F. E. T.

BAUCH (R.). **Ueber inagglutinable Stämme des Bacterium dysenteriae (Shiga-Kruse).** [On Inagglutinable Strains of *B. dysenteriae* (Shiga-Kruse).]—*Cent. f. Bakt.* 1. Abt. Orig. 1918. May 31. Vol. 81. No. 4-5. pp. 228-235.

Bauch investigated 25 strains of bacilli presenting the complete cultural characters of the Shiga-Kruse bacillus, but which could not be identified as such on account of their inagglutinability. He found

that these organisms could be divided into three groups according to their agglutinating properties after repeated subculture on suitable culture media and after heating to 100° C. for one hour. Some strains became positive after being submitted to one or both of these procedures whilst others remained negative.

A satisfactory explanation of this inagglutinability is difficult. Inagglutinable strains were found in the stools sometimes along with typically agglutinable strains at all stages of the disease including convalescence.

F. E. T.

FLU (P. C.). *Experimenteele bijdrage tot de kennis van het bacillen-dragen bij de bacillaire dysenterie.* [An Experimental Contribution to our Knowledge of the Subject of Dysentery Carriers.] - *Geneesk. Tijdschr. v. Nederl.-Indië.* 1918. Vol. 58. No. 1. pp. 67-84.

The author finds by experiment that he can confirm the statement made by others, that ox-bile is a good medium for the growth of Flexner, though not for Shiga-Kruse bacilli. Two flasks containing 5 cc. of ox-bile were each inoculated with a loopful of a 20-hour culture of B. Flexner. In 24 hours both flasks were rendered turbid by growth. Samples were then planted out daily from both flasks on Endo medium, until no further growth was obtained. With one flask this occurred on the 6th day, but with the other not till 3 weeks had elapsed. Control cultures were made at the same time on ordinary agar-slopes with the same result. The bile therefore did not inhibit the growth of the bacilli.

Further experiments in the same direction were then made with rabbits, which were inoculated intravenously with increasing quantities of 24-hour old cultures of Flexner bacilli. The animals were kept for various periods and then killed, the contents of the duodenum, the bile from the gall-bladder, the heart's-blood and the spleen-pulp being inoculated on to Endo plates. The results varied, but in some cases bacilli could be isolated from the bile as late as 2 months after the last injection. The serum of the completely immunized animals agglutinated up to a titre of 1/10,000.

J. B. N.

SCHMITZ (K. E. F.). *Abgrenzung des Bazillus Schmitz gegenüber den Pseudo-dysenteriestämmen und Versuche über die Verwandtschaft der Rassen A bis H untereinander.* [Differentiation of Bacillus Schmitz from Pseudo-Dysentery Strains and Experiments on the Relationship of Strains A to H to Each Other.] - *Cent. f. Bakt.* 1. Abt. Orig. 1918. May 31. Vol. 81. No. 4-5. pp. 213-228.

By the application of CASTELLANI's absorption test [see this *Bulletin*, Vol. 11, p. 451] Schmitz was able to differentiate the Bacillus Schmitz from the other varieties of dysentery bacilli. By the same method he also obtained the best results in differentiating the strains A to H.

F. E. T.

OLIVER (Wade W.) & PERKINS (Orman C.). **Acid Production at Partial Oxygen Tension and under Aerobic Conditions by a Bacillus of the Typhoid Dysentery Group.**—*Jl. Infect. Dis.* 1918. May. Vol. 22. No. 5. pp. 507–510.

This article deals with the fermentative reactions of an un-named bacillus isolated from the faeces of a case of dysentery. Morphologically and culturally the bacillus presented the characteristics of the dysentery bacillus. When grown aerobically persistent acid was produced from dextrose alone, whereas when grown at diminished oxygen tension acid was produced in dextrose, lactose, galactose, maltose, mannite, levulose and saccharose. This phenomenon was considered to be due to certain enzymes which function only under an oxygen tension below the atmospheric.

F. E. T.

MEYER (K. F.) & STICKEL (J. E.). **A Comparative Study of the Efficacy of the Various Agar-Dye-Mediums recommended for the Isolation of Typhoid and Dysentery Bacilli from Feces.**—*Jl. Infect. Dis.* 1918. July. Vol. 23. No. 1. pp. 48–67.

The section of this study dealing with dysentery bacilli is alone dealt with here. The customary assumption that most mediums used for the detection of typhoid bacilli are also suitable for dysentery organisms is stated to be incorrect. In examining cases of infantile dysentery, in studying the presence of dysentery bacilli in the faeces of convalescents, and in searching for dysentery carriers the authors have met with constant disappointments in the results obtained by using ENDO's medium or litmus lactose agar, the substances used as indicators in these media inhibiting or destroying the bacilli sought for. Although their evidence from actual cases is small, they consider that the eosin and methylene blue medium of HOLT, HARRIS and TEAGUE or their eosin-china blue medium prepared with peptic or tryptic digests are superior to ENDO's medium, litmus lactose or Congo-red agar for the direct isolation and detection of dysentery bacilli from stool specimens.

F. E. T.

PŘIBRAM (Ernst). **Ueber Dysenterietoxin und Dysenterieantitoxin. II. Die Spezifität der Toxine und Antitoxine der Mannit vergärenden Dysenteriestämme.** [On Dysentery Toxin and Dysentery Antitoxin. II. The Specificity of the Toxins and Antitoxins of Mannite-Fermenting Dysentery Strains.]—*Cent. f. Bakt.* 1. Abt. Orig. 1918. Mar. 27. Vol. 81. No. 1–2. pp. 37–41.

Working with a strain of mannite fermenting dysentery bacillus isolated by KRUSE, RITTERSHAUS, KEMP and METZ during an epidemic of dysentery Pribram found that the antitoxin produced by this organism protected animals not only against its own toxin but also against that of other members of the same group, although these organisms could readily be distinguished from each other by agglutination tests. This antitoxin also protected animals distinctly, though to a less extent, against the toxin of Shiga-Kruse strains. Shiga-Kruse

antitoxins, on the other hand, did not protect, or only to a trifling extent, against the toxin of the mannite-forming strain.

F. E. T.

OLITSKY (Peter K.). An Experimental Study of Vaccination against Bacilli Dysenteriae.—*Jl. Experim. Med.* 1918. July 1. Vol. 28. No. 1. pp. 69–88.

The purpose of this investigation was to determine a practical method of vaccination against dysentery bacilli. The toxicity of the dysentery group of organisms, especially that of the Shiga bacillus, is such that they cannot be employed in simple saline or aqueous suspensions. When their toxicity is removed by certain chemicals their antigenic properties are so changed as to render them unsuitable for immunization. The toxicity of the bacilli can also be diminished by the addition of immune serum. There is no essential difference in the result whether unmodified serum is used or that modified by GIBSON's method [see this *Bulletin*, Vol. 11, p. 59]. The use of serum with vaccines cannot be recommended in spite of the relative non-toxicity of such mixtures. The specific immunity is reduced while the parenteral injection of horse serum in large groups of men is objectionable because of the serum sensitization which it produces. Perfectly neutral almond oil overcomes many of these disadvantages. The oil acts as a passive agent in merely suspending the bacteria without altering their properties. The slow absorption of the suspended bacteria mitigates the toxic effects of the dysentery bacilli, whilst not interfering with the immunity response antibacterial and antitoxic.

As a result of the slow absorption of the dysentery bacilli from the oily suspension only slight local and general reactions follow, and it is possible to give in a single dose a sufficient number of killed dysentery bacilli to incite a high degree of immunity.

The series of events following the injection of the oily vaccine are : During the 1st day, an erythematous area develops at the site of inoculation which is not especially painful. There may be a slight systemic reaction, consisting of headache and slight chilliness. After 24, sometimes after 48, hours an induration appears at the site of injection from 2 to 4 cm. in diameter, which requires from 1 to 3 weeks for its absorption. The induration remains localised, does not tend to break down, and causes no inconvenience.

The extent to which this vaccination should be applied to man will depend on conditions to be worked out, but it appears to be wholly practicable. The author believes that LE MOIGNIC and PINOY's introduction of an oily medium for suspended killed bacteria for immunization purposes marks a definite advance in the technique of bacterial vaccination [see page 361 of this Number].

F. E. T.

GIBSON (H. Graeme). Results obtained from the Use of Anti-Dysenteric Sero-Vaccine in the Field, with Regard to the Reduction of Case Incidence.—*Jl. Roy. Army Med. Corps.* 1918. May. Vol. 30. No. 5. pp. 476–485.

In 1917 Gibson described the method of preparation of an anti-dysenteric sero-vaccine and detailed exhaustive experimental work

thereon [this *Bulletin*, Vol. II., p. 59]. This vaccine has now been tested under war conditions both in the near East and on the Western Front. As the result of these tests the following conclusions are drawn :—

"(1) That inoculation against bacillary dysentery with this vaccine can safely be carried out, and from the results obtained, as far as they go, there seems to be some hope of reducing the case incidence of this disease in epidemic and endemic areas.

"(2) That the use of this vaccine produces no negative phase, but that it is more difficult to raise the immunity of all individuals with dysentery vaccine than it is with vaccines against other organisms of the intestinal group. Also a period of about twenty-one days is required after the second dose of vaccine before the inoculated man fully responds to the vaccine in the way of producing immune substance. Where practicable, three doses of the vaccine, the third being the same size as the second, should be given for choice.

"(3) That the length of time that the resulting immunity lasts has not been fully established, but that it is probably from four to six months, and may be reckoned analogous to that produced by inoculation against cholera.

"(4) That in view of the above paragraphs wholesale prophylactic inoculation against bacillary dysentery is not advocated by the author, but it would seem reasonable to suggest inoculation at the beginning of the summer months among units and formations in which dysentery has been endemic, and among those in which there may possibly be carriers of the disease. The inoculation of troops among whom there has arisen a sudden outbreak of the disease would also appear safe, and in conjunction with other preventive measures might assist materially, I think, in its control."

F. E. T.

BOEHNCKE, HAMBURGER & SCHELENZ. *Untersuchungen über Ruhr-impfstoffe in vivo und in vitro*. [Investigations into Dysentery Inoculations *in vivo* and *in vitro*.]—*Berlin. Klin. Woch.* 1918. Feb. 11. Vol. 55. No. 6. pp. 134-137.

The difficulties in the way of preparing a workable dysentery vaccine consist (1) in the toxicity of the Shiga strains, (2) the necessity of choosing viruses applicable to various epidemics, and (3) the absence of any definite standards of efficiency.

War experience has shown that "toxic" and "non-toxic" dysentery bacilli are often intimately interwoven and that the finding of one type at the outset does not exclude the possibility of the other type being recovered at a late stage. A dozen strains each of the Shiga and Flexner types isolated from the various epidemics in the East distributed over a wide geographical area were employed. Agar cultures were emulsified in 1 per cent. phenol-saline, sterilized for 20 minutes at 37° C., and then diluted with saline down to 0.5 per cent. The toxicity of these emulsions was neutralized by adding dysenteric anti-toxin. The antigenic properties were then tested by observing the agglutinating properties of the sera of inoculated persons. The first vaccine employed consisted of a mixture of Shiga and Flexner emulsions with antitoxic serum, mixtures containing varying amounts of the three constituents being experimentally tested. They found that the agglutinating power of the mixture was increased coincidentally with increasing the bacterial emulsion and decreasing the anti-toxin content, and that injections of this vaccine were well tolerated, causing slight reaction.

In order to induce a rapid production of antitoxins in the inoculated persons a second vaccine was prepared, consisting of a mixture of Shiga toxin plus antitoxin, together with a certain amount of Flexner emulsion, varying quantities of toxin and antitoxin yielding an over-neutralized, a neutral and under-neutralized mixture. Of the simple toxin-antitoxin mixture the highest dose that could be administered without producing a local necrosis was 0.01 cc. serum + 0.2 cc. toxin in a total volume of 1 cc. and the addition of an equal quantity of Flexner emulsion considerably increased its irritating qualities, an injection of 2 cc. of this mixture producing a general reaction with profuse diarrhoea several hours after its administration. By combining these two vaccines, a third was produced to which the name *Dysbacta* (= *dysentery bacilli* + *toxin* + *antitoxin*) was given. Several combinations were experimented with, but the precise composition of the final vaccine cannot be ascertained from the account and would appear to be the secret of Enoch's Serum Laboratory in Hamburg where the vaccine is manufactured. The following advantages are claimed for this vaccine: (1) it is genuinely polyvalent, (2) it is "multi-partial," (3) it contains a harmless excess of toxin calculated to induce an immunising antitoxic response, and (4) it possesses sufficient antitoxin to prevent any deleterious toxic effect.

Over 100,000 persons have been inoculated with the vaccines, over 250,000 injections having been given. Reactions have not been severe, being comparable to those following typhoid vaccination, and agglutination is produced in 80 per cent. of the cases inoculated.

F. E. T.

Scheelenz (Curt). Ruhrschutzzimpfung mit Dysbacta Boehncke.
[Protective Inoculation against Dysentery with D-B.].—*Med. Klinik.* 1918. Feb. 17. Vol. 14. No. 7. pp. 166-167.

Scheelenz made an extensive trial of BOEHNCKE's *dysbacta* as a prophylactic during an epidemic in an occupied area on the Eastern front. 1,300 civilians and 545 soldiers were subjected to the inoculations and the epidemic of dysentery subsided four weeks after the administration of the prophylactic inoculations.

He recommends that three subcutaneous injections of 0.5, 1 and 1.5 cc. respectively be given below the clavicles at intervals of five days. In cases of urgent necessity where more rapid immunisation is desired two inoculations of 1 and 2 cc. respectively may be given with a week's interval. The injection should be administered towards the end of the afternoon so as to be followed by a night's rest, thus ensuing slighter reaction and more complete protection. Patients with intestinal disorders should not be injected since no benefit can be expected when the disease has started. All contacts should be inoculated unless some definite contraindication exists such as any acute disease, heart disease, debility and menstruation. The sequelae of inoculation, including fever, headache, prostration and local pain, are seldom observed, being restricted to 2 per cent. of those subjected to a first injection of 1 cc. and less frequent and severe after subsequent injections.

Owing to its seasonal incidence dysentery may generally be expected in the second half of July; hence general prophylactic inoculation

should be undertaken before the end of June, but should not be commenced before the beginning of May as we have no evidence that the protection thus conferred lasts longer than six months.

F. E. T.

BUERGERS. Ueber Ruhrschutzimpfung. [On Protective Inoculation against Dysentery.]—*Deut. Med. Woch.* 1918. Apr. 25. Vol. 44. No. 17. p. 464.

In the summer of 1917 Bürgers obtained good results from inoculating a large number of persons subcutaneously with BOEHNCKE'S Dysbakta, 1 cc. and 2 cc. being injected at intervals of five to six days. No serious consequences were observed, but general reactions, comprising headache, malaise and occasionally nausea in 9.5 per cent. of the cases after the first injection and in 8.1 per cent. after the second injection. The incidence of dysentery among the inoculated and non-inoculated in the same district and under the same conditions was in the proportions of 1 to 3.3. There was no mortality amongst the inoculated and amongst the non-inoculated the rate was 1.9 per cent. In 14 days after the second inoculation agglutination occurred from 1 in 50 to 1 in 200 against the different strains of dysentery bacilli.

F. E. T.

MIXED AND UNCLASSIFIED DYSENTERY.

WILLMORE (J. Graham) & SHEARMAN (Cyril H.). On the Differential Diagnosis of the Dysenteries: the Diagnostic Value of the Cell-Exudate in the Stools of Acute Amoebic and Bacillary Dysentery.—*Lancet*. 1918. Aug. 17. pp. 200-206. With 20 text figs.

In this paper Willmore and Shearman contend that (1) Pure amoebic dysentery -i.e., uncomplicated by co-existent bacillary infection - gives rise to a characteristic exudate in the stools, the characters of which are:

(a) Scantiness of cellular exudate, especially the polymorphonuclear element.

(b) Preponderance of mononuclears over polymorphonuclears.

(c) Evidence of proteolytic digestion of the cells, beginning at the periphery and affecting the nucleus last.

(d) Absence of all phenomena characteristic of inflammatory reaction, toxic necrosis and consequent autolysis.

(2) Bacillary dysentery, whether complicated by amoebic infection or not, also gives rise to a cellular exudate of specific character in the stools as follows:

(a) Abundance of cellular exudate, mostly polymorphonuclear.

(b) Preponderance of polymorphonuclears over mononuclears.

(c) Evidence of toxic necrosis of cells, the degenerative changes occurring in all parts of the cell, including the nucleus. Extensive degeneration gives rise to "ghost-cells," the presence of which in any quantity is very typical of bacillary infection.

(d) Evidence of phenomena characteristic of intense inflammatory reaction to microbic infection.

(3) The finding of *Entamoeba histolytica* in the midst of such a bacillary exudate indicates a double infection.

(4) Cases of double infection are of more frequent occurrence than has been supposed and the diagnosis of the amoebic moiety can only be made by finding *E. histolytica*, the scanty amoebic exudate being masked by the overwhelming bacillary exudate.

While the consequences of neglected amoebic infection may be disastrous, it is of still more immediate importance that bacillary dysentery should receive prompt recognition and appropriate serum treatment.

F. E. T.

BONEY (T. K.), CROSSMAN (L. G.) & BOULENGER (C. L.). **Report of a Base Laboratory in Mesopotamia for 1916, with Special Reference to Water-Borne Diseases.**—*Jl. Roy. Army Med. Corps.* 1918. Apr. Vol. 30. No. 4. pp. 409–423.

The portion of this Report dealing with the Dysenteries only is considered here.

The stools of 890 cases of intestinal disorder were investigated during the last four months of 1916. The protozoal findings were as follows:—

	Number.	Percentage.
<i>Entamoeba histolytica</i> ..	142	15·9
„ <i>coli</i> ..	162	18·2
„ <i>nana</i> ..	4	0·45
<i>Lamblia intestinalis</i> ..	88	9·9
<i>Trichomonas intestinalis</i> ..	72	8·1
<i>Tetramitus mesnili</i> ..	52	5·7
<i>Coccidium (Isospora Sp.)</i> ..	7	0·8

The bacteriological findings were as follows:

209 stools were plated with the following results.

<i>B. dysenteriae</i>	{ Shiga	65	} = 108.
	{ Flexner	38	
	{ Shiga & Flexner ..	5	
	{ Negative	101	

Thus 108 cases, or 51·7 per cent. of those submitted to bacteriological examination were proved to be due to *B. dysenteriae*; and the relative incidence of the two forms will be: Amoebic 26 per cent., bacillary 35 per cent. of the total number of cases examined. Two cases of mixed amoebic and bacillary infection (once Shiga, once Flexner) were found.

In 39 per cent. of the acute cases the causal agent was not determined. A bacillus of the Morgan No. 1 group was isolated once, and possibly repeated examinations would have discovered more cases of bacillary infection. The Medical Advisory Committee reported that “It is thus apparent that bacillary dysentery is the predominant type in the Mesopotamian area (as in other war areas) and there is little doubt that, had the cases investigated been in the main local admissions instead of transfers from up river the proportion of bacteriologically proved bacillary cases would have been still larger.”

F. E. T.

MAUBIAC (P.). *Quelques remarques à propos d'une épidémie de dysenterie.*—*Jl. de Méd. de Bordeaux.* 1917. Apr. Year 88, No. 5. pp. 89-95.

From August 25 to October 15, 1916, 240 cases of dysentery were admitted to the mixed hospital at Libourne. This figure only includes soldiers sent to the hospital, the slighter cases being treated in the regimental infirmary.

The complications encountered were numerous and varied and included phlegmonous tonsillitis, gangrene of the mouth, plegmasia alba dolens, non-suppurative parotiditis (staphylococci obtained on culture), arthritis, conjunctivitis and the conjunctivo-urethro-synovial syndrome.

The associated diseases included malaria, acute sero-fibrinous pleurisy, and acute congestion of the lungs. Shiga's bacillus was only identified twice. Paratyphoid B was encountered in the stools of one dysenteric patient. The coli-bacillus was obtained five times, and ten times bacilli intermediate in characters between the dysentery bacillus and coli-typhoid bacilli.

The results of agglutination were disappointing and lead to no precise conclusion. The anti-dysenteric serum of the Pasteur Institute did not fulfil expectations, so that it was necessary to fall back on the older remedies, which often proved more efficacious.

F. E. T.

BITTORF (A.). *Die Ruhrneuritis.* [Dysenteric Neuritis.]—*Deut. Med. Woch.* 1918. May 23. Vol. 44. No. 21. pp. 567-568.

According to Bittorf, dysenteric neuritis has received little attention until quite recently.

He here records the occurrence of neuritis in one per cent. of the cases in an extensive epidemic and this did not include cases of symmetrical acroparaesthesia which were often observed. The neuritis started during recovery or when the acute intestinal symptoms had disappeared. Consequently it was considered to be a secondary toxic neuritis due to the absorption of bacteria or their toxins from the ulcerated intestine. Malnutrition and loss of fat, which causes the disappearance of fat from the medullary sheath of the nerves, favour the occurrence of neuritis. The majority of the cases seen were cases of sensory neuritis, the sensory disturbances being partly subjective and partly objective and without trophic changes. Although muscular spasms and cramps, especially of the calf muscles, were not very rare, only one case of severe motor neuritis was seen. This affected the ulnar nerve and led to atrophy of the small muscles supplied by it. Measures taken to combat the neuritis included hot air, generous feeding and careful treatment of the intestinal condition.

F. E. T.

GALAMBOS (A.). i. *Zur Klinik der Dysenterie.* [The Clinical Aspect of Dysentery.]—*Wien. Klin. Woch.* 1918. Apr. 4. Vol. 31. No. 14. pp. 381-385.

——. ii. *Zur Behandlung der Dysenterie.* [On the Treatment of Dysentery.]—*Ibid.* May 9. No. 19. pp. 529-532.

i. Basing his remarks on an experience of more than 1,500 cases Galambos divides dysentery into three types according to the clinical

appearances :—(1) The classical type, to which the majority of cases of dysentery belong ; (2) The choleric type, in which symptoms of the severest intoxication dominate the clinical picture ; and (3) The hydraemic type, in which oedema of neither renal nor cardiac origin occurs.

ii. Reviewing the various medicaments commonly employed in dysentery Galambos insists on the value of morphine injections and of methylene blue.

F. E. T.

LOEB. Erfahrungen in der Behandlung akuter Ruhrfälle während 7 Wochen in einem Feldlazarett. [Experiences in the Treatment of Acute Dysentery during 7 Weeks in a Field Hospital.]—*Münch. Med. Woch.* 1918. Apr. 30. Vol. 65. No. 18. pp. 473-474.

In Loeb's experience the most effective means of checking the diarrhoea with frequent muco-sanguineous stools and tenesmus consisted in the administration twice daily of enemata of 200 cc. of water at blood heat containing 1 cc. of a 1 in 1,000 solution of adrenaline and 0.02 gm. cocaine. The best method of disinfecting the intestinal tract consists in the administration of 20 grammes of animal charcoal by the mouth. To combat the heart weakness resulting from the severe diarrhoea large saline infusions were injected subcutaneously.

F. E. T.

THIMM (Lea). Behandlung von Dysenterie mit Palmitinsäure-Thymolester-Thymolpalmitat (Merck). [The Treatment of Dysentery with Palmitic Acid-Thymol-Ester, Thymolpalmitate (Merck)].—*Deut. Med. Woch.* 1918. June 27. Vol. 44. No. 26. p. 716.

From July to October 1917, 75 cases of dysentery in males were treated at the Friedrichshain Hospital in Berlin. The treatment was entirely symptomatic with a mortality of $33\frac{1}{3}$ per cent., or, excluding men over 70, of 13 per cent. Dissatisfied with these results and influenced by the work of ELLINGER and ADLER on intestinal disinfection, MERCK's palmitic acid thymol ester was given in 5 gramme doses twice daily for five days. Good results were observed both in the condition of the stools and in the general improvement of the patients. The drug was also given to a typhoid carrier, with complete disappearance of the typhoid bacilli from the stools. The author believes that, although his cases are not in large numbers, thymol palmitate provides a more hopeful remedy for dysentery than any other therapeutic agent.

F. E. T.

WADDELL (William). Post-Dysenteric Diarrhoea and its Treatment. An Excerpt from Notes on 2,000 Cases at the Military Dysentery Convalescent Hospital at Barton-on-Sea.—*Jl. Roy. Army Med. Corps.* 1918. June. Vol. 30. No. 6. pp. 593-594.

Diarrhoea is the commonest sequela of an attack of acute dysentery both amoebic and bacillary. Astringents fail to cure this condition.

Examination of the stools and of the patients show that all the symptoms, objective and subjective, indicate a derangement of the liver functions—particularly a dyscrasia of the bile, a reduced output or both. Putrefaction of the bowel contents ensues. In order to promote a large flow of clean healthy bile full doses of tincture of rhubarb should be given. If necessary, this is repeated once or twice until the colour of the motions assumes a healthy brown or yellow tone. The diarrhoea now usually stops. If not, thirty grains of bismuth subnitrate with ten drops of hydrochloric acid and ten of tinct. opii. are given twice or thrice daily. The diet should be soft and fluid and a tonic containing pepsin should follow the cessation of the diarrhoea. Small doses of tinct. rhei are quite useless; the dose must be large, and its action full and speedy. For carrier cases tinct. rhei. co. is useless.

F. E. T.

MARET (E.). **Ein einfaches Mittel zur Bekämpfung schwerer Darmblutungen bei der Ruhr.** [A Simple Measure for Combating Severe Haemorrhage in Dysentery.] *Münch. Med. Woch.* 1918. Feb. 26. Vol. 65. No. 9. p. 242.

Maret claims to have rapidly checked severe haemorrhage in dysentery by the two hourly administration of lead acetate made up into an emulsion with gum arabic, egg albumen, and distilled water. The disappearance of the haemorrhage is accompanied by a diminution in the number of the stools and by a rapid improvement in the general condition of the patient.

F. E. T.

SIMON (Sidney K.). **Cercomonas Diarrhea and its Management.**—*Southern Med. Jl.* 1918. June. Vol. 11. No. 6. pp. 414-417.

In this paper a brief description of *Cercomonas hominis* is given, followed by an account of the clinical symptoms produced by it in man, and the treatment adopted by the author. He does not think that any known means of treatment can be considered satisfactory in eliminating a *Cercomonas* infection once it has become firmly implanted. In the discussion which followed the paper one speaker laid great emphasis on the absolute necessity of conducting examinations of faeces for protozoal parasites at the earliest possible moment; he deprecated the habit of sending such specimens to a laboratory, and urged the importance of microscopic examination at the wards.

B. B.

CADE (A.) & HOLLANDE (A. Ch.). **Essai de traitement, par le néo-salvarsan, de l'entérite chronique à *Giardia (Lamblia) intestinalis*.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1918. Apr. 18. 3 Ser. Vol. 34. No. 11-12. pp. 314-317.

Having observed a dozen cases during the last few months the authors consider that *Giardia (Lamblia) intestinalis* produces in the human intestine a chronic enteritis. They point out the inefficiency of the most diverse medicaments, including novarsenobenzol in keratinised pilules by the mouth.

They have treated three cases with intravenous injections of novarsenobenzol. The first received three injections of 0.30 gramme with only the temporary disappearance both of amoebae and Giardia. The second received four injections of 0.30, 0.45 and 0.6 and 0.75 grammes and the Giardia disappeared completely though the stools remained abnormal in frequency and consistency. The third received four similar weekly injections and the stools remained diarrhoeic with Giardia cysts abundant.

F. E. T.

LANZENBERG (A.). *Un cas de Balantidiose autochtone. Son traitement.*—*Bull. Soc. Path. Exot.* 1918. July. Vol. 11. No. 7. pp. 558-559.

The patient, a soldier, had never been out of France and during the war even while in France had not been in close contact with colonial troops. On May 10th 1917 he was admitted to hospital suffering from diarrhoea. He was treated for "enteritis" and on improving was sent to his depot for convalescence. In November 1917 he reported sick again with the same symptoms and he was sent to hospital at Rennes, where M. BRUMPT found *Balantidium coli* in the stools. He was then unsuccessfully treated in turn with nitrate of silver and calomel, thymol, chloroform, novarsenobenzol alone or with emetine hydrochloride. On the recommendation of BRUMPT quinine hydrochloride was given in the strength of 0.75 grammes of the salt in 300 of water. This solution was injected twice daily into the rectum after irrigation with boiled water. Rapid improvement followed; and the parasites became less numerous in the stool, until at the end of about 6 weeks they had completely disappeared and treatment was therefore stopped. The patient's stools then immediately became normal. A control of the case by means of one examination every week for a month following treatment is stated to have confirmed the cure, the stools remaining normal, and no parasites or cysts being discoverable in them.

F. W. O'C.

KINDBORG (E.). *Zur Klinik und Bakteriologie der Ruhr.* [On the Clinical Aspect and Bacteriology of Dysentery.]—*Berlin. Klin. Woch.* 1917. Apr. 30. Vol. 54. No. 18. pp. 435-438.

Kindborg considers that dysentery is a clinical disease-picture characterised by an ulcerative condition of the large intestine and may be produced by all those bacteria, as well as amoebae, which succeed in overcoming the vital resistance of the intestinal wall and penetrate it, general symptoms being due to the toxic action of these organisms. The Shiga-Kruetz bacillus possesses these characters in the highest degree and epidemiologically gives rise to the severest forms of infection. Next comes the Flexner Y type which usually causes slighter infections but may also give rise to the severest symptoms. Slight cases may also be due to glucose fermenting para-dysentery bacilli and to "white coli" the importance of which cannot yet be judged. Paratyphoid and occasionally typhoid bacilli may attack the large intestine and give rise to the clinical picture of dysentery. By creating a powerful reaction in strong persons it may give rise to cholera-like symptoms, and conversely, cholera may occasionally assume the clinical aspect of dysentery. Non-bacterial inflammatory conditions do not give rise to epidemics and do not produce general symptoms. Lastly, the finding of bacillary-like bacilli in meat may not be devoid of importance.

F. E. T.

PRYM (Paul). Allgemeine Atrophie, Oedemkrankheit und Ruhr. [General Atrophy, Oedema and Dysentery].—*Deut. Med. Woch.* 1918. May 16. Vol. 44. No. 20. pp. 544-545.

On the basis of a series of autopsies Prym came to the conclusion that general atrophy and oedema occurring as sequels of dysentery are not primarily due to the dysenteric changes in the intestine, but to nutritional disturbances of either a qualitative or quantitative nature or of the two combined.

F. E. T.

MALARIA.

BAHR (P. H.). On the Transmission of the Subtertian Malaria Parasite (*Plasmodium falciparum* Welch, 1897) by Egyptian Anopheles.—*Jl. Roy. Army Med. Corps.* 1918. June. Vol. 30. No. 6. pp. 606–608.

This experienced observer records having, in October–December 1916, fed large numbers of *Anopheles pharoensis* and *turkhudi* on a patient whose blood continued rich in crescents.

Of 36 *A. pharoensis* that lived beyond the 4th day after feeding only one became infected, the infection being limited to two large oocysts containing sporozoites, observed on the 15th day after the original feed.

Only 3 *A. turkhudi* survived beyond the 3rd day after a feed and only one to the 10th day, and in the stomach of this one 96 pigmented oocysts were counted.

A. Alcock.

CARTER (H. R.). Effect of *Anopheles punctipennis* on the Natural Conveyance of Malarial Fever.—*Public Health Rep.* 1918. Apr. 19. Vol. 33. No. 16. pp. 572–575.

A. punctipennis has been shown by experiment to be capable of transmitting malarial fever, but to what extent it is a natural carrier has not been determined. It is rarely found in houses in the day time, but it is not known whether it comes in to houses at night.

In two localities known to the author to be much frequented by this species malaria is hardly known; and though an outbreak of malaria has been reported in a place where this was the only species present, the author himself has never found malaria prevalent where only this species was breeding.

A. A.

GROS (H.). L'unité des protozoaires du paludisme —*Bull. Soc. Path. Exot.* 1918. July. Vol. 11. No. 7. pp. 624–641.

This is a pure disputation, not an experimental research.

The author's principal conclusions are (1) that there is only one species of malaria parasite; (2) that this species assumes different forms according to climate, season, and the natural reactions of the host; (3) that it is transmissible in each one of its several forms, clinical and microscopic.

According to the author the simultaneous presence of two forms in the host's blood signifies not a mixed infection, but the course of transformation of one form into another.

A. A.

WILLIAMS (E. J.). Malaria in the Army.—*Canadian Med. Assoc. Jl.* 1918. June. Vol. 8. No. 6. pp. 523–529.

There is nothing very new in this interesting paper, one design of which is to attract attention to the possible spread of malaria

after the war by returned soldier convalescents—a possibility which the author, without being in the least an alarmist, thinks should be considered and studied.

In the author's Macedonian experience with Canadian troops high temperature and hard labour were potent influences in provoking latent and dormant malaria into activity; the value of quinine as a prophylactic was doubtful; the most effective method of giving quinine was the intravenous (5 to 7 grains in 200 to 300 cc. of normal saline once or twice a day); the concurrent use of arsenic was generally beneficial; and it is considered that systematic treatment should be continued over a term of 12 to 18 months. Where large numbers of men who have suffered from malaria are stationed together for a long time this prolonged treatment is best carried out by quinine parades.

A. A.

DUNLEY-OWEN (A.). *Notes on Malaria*.—*S. African Med. Rec.* 1918. May 11. Vol. 16. No. 9. pp. 136–138.

The author out of his Rhodesian experience endorses the view that malarial fevers diminish both in frequency and intensity as the general conditions of living improve.

In the treatment of malarial fever the author has found intramuscular injections of atoxyl, concurrently with quinine by the mouth, to be most successful. He begins with 1 gr. of atoxyl and gradually increases the dose to 3 gr. daily, and gives 30 gr. of quinine bihydrochloride daily in tripartite doses, and finds that 6 to 9 days of this treatment are usually sufficient. In the course of many years he has never met with optic atrophy as a sequel.

A. A.

PLEHN (A.). *Ueber Malaria*.—*Berlin. Klin. Woch.* 1917. Apr. 30. Vol. 54. No. 18. pp. 431–435.

Some points in this address given by a German authority are worth noting. He attaches no importance to giving quinine in solution because the technique of manufacture of tablets is now so reliable that there is no fear of their undigested passage; he however considers the drug to have a much stronger action when given parenterally, partly because it has not to pass the portal circulation where, as a result of animal experiments, he believes that much quinine is destroyed. He criticises prolonged “quinine cures” in which the drug is given over weeks in gramme doses for the prevention of relapses, considering that the digestive and nervous systems are disturbed and convalescence delayed. Most heart disturbances in malaria are attributable to quinine treatment. He thinks that 6 months relapse prophylaxis after the last acute attack is needed to rid the patient entirely of infection and that half gram doses are sufficient this as the result of 16 years experience in Germany following the Cameroons; the quinine is never given for more than three days running, and the intervals should never exceed four days. The interrupted method is considered far superior to the continuous. Plehn does not think that returned chronic cases constitute any special danger to Germany.

He instances the thousands of malarial patients who pass yearly through English, French and Dutch oversea ports without adequate treatment or any special precaution, and yet malaria has never re-established itself when once it had been got rid of.

A. G. B.

AYNAUD (Marcel). **Contribution au mécanisme de l'accès palustre.**—*C. R. Soc. Biol.* 1918. May 11. Vol. 81. No. 9. pp. 485-486.

This contribution is of a purely speculative character. The author regards the febrile paroxysm of "secondary" malaria as the clinical expression of an antigen-antibody reaction; though the patient has acquired a certain amount of immunity, so that the multiplication of the parasite is more or less restrained, he has become excessively sensible to the toxin or to the soluble antigen.

A. A.

SERGEANT (Edm.). **A propos des macules des globules rouges dans la tierce maligne.**—*Bull. Soc. Path. Exot.* 1918. May. Vol. 11. No. 5. pp. 366-367.

The author does a small service to Humanity by drawing attention to the facts that the phenomenon now commonly known as "Maurer's spots" was carefully described by STEPHENS and CHRISTOPHERS in Reports to the Malaria Committee of the Royal Society, 1899-1900, Series I, p. 17, and that MAURER's account of the phenomenon was published in 1902.

The author therefore approves the substitution of the term "Stephens' and Christophers' dots" for "Maurer's spots" a substitution which, as he points out, has already been made by MACFIE and INGRAM in the *Annals of Tropical Medicine and Parasitology*, Vol. 11, 30th June, 1917, p. 11.

A. A.

BARR (David P.) & DU BOIS (Eugene F.). **Clinical Calorimetry. Twenty-Eighth Paper. The Metabolism in Malarial Fever.**—*Arch. Intern. Med.* 1918. May 15. Vol. 21. No. 5. pp. 627-658. With 13 figs.

The respiration calorimeter of the Russell Sage Institute, which supplies the necessary data from which changes in the average temperature of the body can be calculated, has been described in the *Archives of Internal Medicine*, 1915, Vol. 15, p. 805; and the method of indirect calorimetry, which furnishes the most trustworthy measurements for the determination of heat production in short periods, has been fully described in the same volume of those *Archives*, p. 793.

The present paper describes and discusses experiments made on patients in different periods of malarial fever by methods of both direct and indirect calorimetry. In the direct method the heat lost by direct radiation and conduction and by vaporisation through lungs and skin is measured and calculated; and the heat production is determined by observation of the rectal temperature, which, however, does not accurately indicate the heat of the entire body in short periods.

Summarising the results of their observations and experiments by both methods the authors divide the periods of malarial paroxysms as follows :—

1. *Preliminary*.—Temperature constant ; no change in metabolism.

2. *Prodromal*.—Fifteen or twenty minutes before the chill a slight rise in rectal temperature.

3. *Chill*.—Rectal temperature rises abruptly ; the surface of the body becomes relatively and perhaps actually cooler ; the average body temperature rises somewhat less abruptly than the rectal temperature. In spite of the enormous increase in heat production the heat elimination is the same as in the preliminary stage ; almost all the extra heat is stored in the tissues.

4. *Rising temperature after chill*.—Rectal temperature rises less rapidly than during chill ; the surface becomes warmer. There is a slight increase in heat elimination.

5. *Continuous high temperature*.—Rectal temperature is constant ; surface temperature rises steadily. Heat elimination begins to equal heat production.

6. *Falling temperature*.—Rectal temperature falls much more gradually than it rises. The surface temperature at first may continue to rise then to fall gradually, and later to fall at about the same rate as the rectal. The heat elimination is greatly increased, chiefly through sweat.

The respiratory quotients during the chill are higher than before and afterwards, suggesting the rapid combustion of stored glycogen during the violent muscular contractions of shivering.

The authors conclude, *inter alia*, that in malarial paroxysms the pyrexia is mainly due to increasing heat production ; that the subsequent fall in temperature is due to greatly increased heat elimination with a heat production that is very slightly more than normal ; and that there is no indication of abnormal processes of metabolism, except that the protein metabolism is slightly increased.

A. A.

HOFFMANN (W.). **Ueber die Erfolge regelrecht durchgeführter Malaria-provokationen.** [The Results of Systematic Malarial Provocations.]

—*Deut. Med. Woch.* 1918. July 11. Vol. 44. No. 28. pp. 768–769.

The methods adopted were : (1) Subjection to 55° C. (131° F.) in a hot air chamber for 10 minutes till gentle perspiration appeared, or in bed by means of a hot air apparatus, followed at once by 3 minutes in a bath at 20° C. with friction, especially over the heart, and rest in bed ; 24 hours later a repetition. (2) Faradisation of the splenic region on two successive days till the skin became strongly red ; muscular exercises, such as wood sawing and gymnastics ; afterwards hot and cold douches or warm compresses on the splenic area and a day's rest in bed.

Of 482 malarial convalescents from 1917 on the Eastern Front who underwent the experiments 35 showed malaria either clinically or microscopically. [In the original 41 are counted, but 6 showed parasites before the provocative treatment.] Of the 35, 13 relapsed after one course, 3 after 2, 4 after 3, and the remaining 15 after 4 to 12 treatments. [No information as to the time covered by the treatments or the period of year ; nor is the type of malaria stated.] In

most cases the parasites seen were gametes. Similar experiments were made in the Austrian troops in the same area, with the result that of 306 men 25 were shown to carry parasites, or 8 per cent.

[These experiments might have been of much value, had there been any system of control and if more data were supplied.]

A. G. B.

MEDEDEELINGEN VAN DEN BURGERLIJKEN GENEESKUNDIGEN DIENST IN NEDERLANDSCH-INDIË. 1918. Part 4. pp. 1-46. With 7 maps & 23 plates.—*Die Malaria in Telok Betong*. [Also in Dutch.]

Telok Betong is a port on the Lampong Bay in the south of Sumatra, which promised to be of considerable importance. A better harbour has however been found in another part of the Bay and this forms the railway terminus, so that Telok Betong is likely to be superseded. This report gives some information of the incidence and type of the malaria found at Telok Betong and much detail of the sanitary engineering which it is proposed to carry out to improve the town and provide it with a conservancy system and drinking water. It is stated however that the best plan would be to lay out the township afresh. Incidentally one learns of the errors that have been made through failure to consult experts on malaria transmission and to study the habits of the local malarial mosquitoes. The report, it will be seen, is chiefly of topical interest.

A. G. B.

RODENWALDT (Ernst) & ZEISS (Heinz). *Malarlastudien im Willajet Aidin (Kleinasien)*. *Arch. f. Schiffs- u. Trop.-Hyg.* 1918. Apr. Vol. 22. No. 7-8. pp. 97-128. With 3 maps.

The district concerned lies on the west coast of Asia Minor, south of Smyrna, and comprises the ancient river valleys of the Cayster and Meander, on which lay the cities of Ephesus and Miletus. These towns and neighbouring villages have long sunk into decay, partly owing to the silting up of harbours and partly to malaria. The authors treat at great length of the topography, the changes in the beds of the rivers, and swamp formation. They give statistical tables showing the fertility of the women of the several nationalities and conclude that 75 to 90 per cent. of the children die in the first five years of life, in their opinion from malaria. The results of examination of the children for malaria are given in tabular form (blood, spleen and haemoglobin content) and recommendations are made. No Anopheles were seen.

A. G. B.

ROUCHÉ. *Le paludisme à bord du "Desaix" pendant deux hivernages (1916-1917) sur la côte occidentale d'Afrique*. *Arch. Méd. et Pharm. Nav.* 1918. July. Vol. 106. No. 1. pp. 5-20.

Malaria raged with great violence at Dakar during the latter part of 1916 and of 1917. Easy of achievement as sanitary control appeared to be, no serious attempts seem to have been made to stay the increase of Anopheles. Among the European personnel of the port the

percentage of infections reached at one time 90 to 95, and among the European contingent of the 4th Senegal regiment 97. In one ship after a short stay in the port 420 of the ship's company were infected, in two other ships 409.

The classical paroxysm of three stages was quite rare, the common hour of onset was between noon and 2 o'clock, and the clinical manifestations usually took the form of a bilious gastric fever.

A feature of the epidemics was the large number of cases in which the attack was consummated in a single febrile paroxysm followed by prolonged and pronounced asthenia and anaemia.

Numerous latent infections characterised by obstinate facial neuralgia yielding to quinine were observed, though these were not included in the returns of malaria.

The best treatment was found to be after preliminary purgation, cooling drinks, and a dram of Regnault's solution of iodo-iodurate—1·5 or 2 gm. of hydrochlorate of quinine daily, divided into a morning and evening dose, during the continuance of fever, along with 0·05 gm. of "arrhéna" (Di-sodium methyl arsenate) every eight hours. In the fever-free intervals the quinine was reduced first to 1 gm., then to 0·50 gm. The reduced dose was continued for 3 weeks or a month of convalescence.

A. A.

DELAMARE (Gabriel) & ROBIN. *Carte du paludisme des Confins albano-macédoniens.*—*Bull. Soc. Path. Exot.* 1918. June Vol. 11. No. 6. pp. 483-503. With 1 map & 1 chart.

This paper contains a mass of topographical detail regarding numerous valleys that drain into L. Presba: some of the valleys are marshy and malarious, others are not. The endemic index (spleen) as a whole is low. The *Anopheles* recorded by the author is *maculipennis*, and the blood-examinations have revealed both *Plasmodium vivax* and *P. falciparum*.

A. A.

BLANC (Georges) & HECKENROTH (Ferdinand). *Répartition du Paludisme dans la région de Koritza (Basse Albanie). Carte des indices spléniques.*—*Bull. Soc. Path. Exot.* 1918. June. Vol. 11. No. 6. pp. 470-483. With 1 map.

The plain of Koritza in eastern Albania is enclosed by high mountains draining into the R. Devol which at the northern end of the plain expands into a marshy lake, L. Malik. It is highly malarious. The only form of infection observed so far is *P. vivax*; and the only species of *Anopheles*, *maculipennis* and *bifurcatus*, both of which have frequently been found with the salivary glands naturally infected.

The endemic indices of the numerous villages of the plain are recorded by the author.

A. A.

MATERNA (A.). *Tropische Malaria unter der in Ostschlesien ansässigen Zivilbevölkerung.* [Tropical Malaria among the Civil Population of Eastern Silesia.]—*Wien. Klin. Woch.* 1918. May 2. Vol. 31. No. 18. pp. 498-499.

Malaria, presumably tertian, is stated to be endemic in this region, watered by the Vistula, and in the neighbouring Prussian Silesia.

In a recent enquiry 2,000 blood preparations were examined by the thick film method and in 3 crescents were found—from children of one and three, and a boy of 16. The author considers that the local mosquitoes have become infected from soldiers carrying subtertian parasites returning from Albania, Macedonia and Rumania. He believes this to be the first record of subtertian malaria in Central Europe with the exception of that of RIEGEL [this *Bulletin*, Vol. 7, p. 266]. The Anopheles found in Eastern Silesia have not been determined.

A. G. B.

SEYFARTH (Carly). **Komatöse und dysenterische Formen der Malaria tropica in Südostbulgarien.**—*Münch. Med. Woch.* 1918. May 28. Vol. 65. No. 22. pp. 589–591.

South-east Bulgaria, the strip of coast between the mouths of the Maritza and Mesta-Karazu rivers, is more severely visited with malaria than any other part of that country. In two and a half years several thousand cases have been seen, with a high mortality. In the early days a number of people were brought to hospital moribund and died after a short period of observation with such diagnoses as meningitis, uraemia, dysentery, typhoid—till malaria parasites were found post mortem. The author gives details of comatose forms, in which post mortem the brain marrow is found studded with punctiform haemorrhages, and dysenteric forms such as have been described by many workers in the Balkan States [see, for instance, CASTELLANI, this *Bulletin*, Vol. 11, p. 9]. Cases of the latter character must have their quinine by the needle.

A. G. B.

HALL (Arthur J.), WILLIAMS (Egerton H.) & DOUGLAS (J. Sholto C.). **Two Fatal Cases of Aestivo-Autumnal Malarial Fever occurring in England.**—*Lancet*. 1918. May 25. pp. 734–735. With 2 charts.

The subjects of these two cases were men who had recently arrived in England on leave from Egypt. On their way home they had slept in tents for two nights at a place in Italy notorious for malaria, and in the autumnal malaria season. As their history prior to departure from Egypt was quite clear of malaria, and their health at the time of leaving was good, the authors are probably justified in assuming that the infection was acquired in Italy. Hence the title of their paper is slightly misleading.

A. A.

REPORTS TO THE LOCAL GOVERNMENT BOARD ON PUBLIC HEALTH AND MEDICAL SUBJECTS. (New Series No. 119). **Reports and Papers on Malaria contracted in England in 1917.** [BUCHANAN (G. S.), BASSETT-SMITH (P. W.), WILKINSON (E.), JAMES (S. P.), GROVE (A. J.), PARSONS (A. C.) & MACDONALD (A.)].—ix + 85 pp. With 1 map. 1918. London: H.M. Stationery Office.

This batch of papers contains, besides a careful account of the incidence and probable origin of the malaria contracted in England

in 1917, a valuable dissertation by Colonel S. P. JAMES on the aetiology, diagnosis, treatment and prevention of the disease, and some account, mainly by Mr. A. J. GROVE, of the indigenous *Anopheles* mosquitoes, the object of the whole being to arm medical practitioners and officers of health in this country against a possible revival of malarial fever through returned convalescents from the expeditionary forces.

The total number of indigenous cases in 1917, so far as known, was 178, all being benign tertian and none very severe; the majority of them occurred in the estuarine areas of the Thames and Medway, and at Sandwich, naval and military areas where *Anopheles* mosquitoes are normally abundant.

A. A.

RIEUX. *Le paludisme autochtone.* *Arch. Méd. et Pharm. Milit.* 1918. Apr. Vol. 69. No. 4. pp. 559-569.

The author distinguishes between true native malaria which still survives in a few decreasing marshy areas of France, and the indigenous propagation of malarial infection imported by carriers belonging to or connected with the army, which has lately been observed in many parts of France.

The total number of cases of the latter class that occurred in 1917 was, so far as is known, 258, of which all but a very few were benign tertian. The author considers that though this is a matter that deserves reasonable attention it is nothing to make a fuss about.

The diagnosis, treatment, and prevention of malaria are discussed. As regards prophylaxis the author considers it unnecessary, and indeed somewhat absurd, to attempt all the methods that are requisite in uncivilised countries where malaria is endemic. The measures that he advocates are systematic treatment of all returning carriers in special hospitals, instruction of all medical practitioners in the diagnosis and treatment of the disease, and the efficient distribution of quinine in all foci of infection; and of course the present is a favourable occasion for attempting to reclaim such foci.

A. A.

KIRK (J.). *Malaria and Diseases of the Eye.*—*Brit. Med. Jl.* 1918. Aug. 3. pp. 110-111.

In the author's experience a good deal of the eye-disease commonly attributed directly to malaria is due to other causes, e.g., latent errors of refraction, malnutrition, various debilitating diseases besides malaria—the particular incidence of which is favoured or enhanced by tropical glare, dust, &c. Eye-troubles that he regards as due to the direct effect of malaria are the following: Keratitis dendritica as a sequel to malarial herpes of the cornea (as frequently of influenza); muscular paralysis due to malarial poisoning of the 3rd, 4th, and 6th nerves; malarial neuralgia of the ophthalmic division of the 5th nerve; malarial neuro-retinitis going on to atrophy and blindness, and rarely retro-bulbar neuritis, in malignant infections; and retinal haemorrhages, due either to thrombosis following parasitic embolism in subtertian infections or to blood degenerations, in chronic infections,

but such retinal haemorrhages are not so common in malaria as is supposed, and even when occurring in malarial cases may possibly be due to excessive quinine or peculiar susceptibility to quinine.

A. A.

LYON (Ernst). **Wirbelschmerzen bei Malaria.** [Vertebral Pains in Malaria.]—*Deut. Med. Woch.* 1918. July 18. Vol. 44. No. 29. pp. 805-806.

The author describes, as occurring in a small percentage of his cases—chiefly long latent or relapsing tertian—radiating pains in the lower dorsal and lumbar region, with stiffness, tenderness, and superficial hyperaesthesia; all the symptoms disappear under quinine.

A. G. B.

HARRINGTON (A. W.) & WHITELAW (W.). **Post-Malarial Severe Anaemia.**—*Glasgow Med. Jl.* 1918. June. Vol. 89. New Ser. Vol. 7. No. 6. pp. 321-342.

The authors have very carefully examined 80 cases of post-malarial anaemia, chiefly Serbian soldiers, and give abstracts and detailed records of blood-examinations of the 22 gravest. They note that in severe cases the anaemia has all the characters of pernicious anaemia, but without evidence of oral or intestinal sepsis; also that treatment by arsenic concurrently with quinine usually leads to recovery.

A. A.

PORAK (René). **Les poussées de splénomégalie simple au début du paludisme.**—*Presse Méd.* 1918. Apr. 22. Vol. 26. No. 23. pp. 208-210. With 2 charts.

The author would recognize as a clinical and pathological entity an enlargement of the spleen, of which he has observed 16 instances in Macedonia, occurring as the first evidence of a malarial infection and unaccompanied by malarial pyrexia. The preliminary symptoms noticed by the author are various: in 6 cases pallor, emaciation, and sense of fatigue along with headache and digestive troubles; in 6 cases pain in the splenic region; in 3 cases lumbar pain; in 1 case a persistent cough, with scapular pain; in 1 case a diffuse erythema; in 1 case sciatica. The enlargement usually subsides in a few days, sometimes without special treatment if the patient be kept at rest; or, if insufficiently attended to, it may develop along the usual lines of malarial pathology. The author thinks the phenomenon may possibly be explained by the prophylactic use of quinine hindering the development of parasites but not destroying them entirely; and he regards it as evidence of that reactionary or defensive function of the spleen by which, he thinks, the phenomenon of latent malaria is also explained most satisfactorily.

A. A.

PAISSEAU (G.) & HUTINEL (Jean). **Méningite palustre.**—*Bull. et Mém. Soc. Méd. Hôpù. de Paris.* 1918. May 24. 3 Ser. Vol. 42. No. 17-18. pp. 484-487.

The authors believe that true malarial meningitis has not been recognised, at any rate so far as pathological changes in the meninges and cerebro-spinal fluid are concerned. These changes vary with the severity of the attack, and range from discrete and purely anatomical affections of the meninges, up to—in the severest cases—well marked alterations in the cerebro-spinal fluid, such as increase of albumin and the appearance of fibrinous flocci, and the presence of lymphocytes and medium-sized uninuclears in more or less abundance and sometimes also of endothelial cells.

Clinically the symptoms have also a wide range. Sometimes they consist of a series of nervous manifestations—facial herpes, transient amaurosis, paralysis of one of the cranial nerves—not particularly meningeal in character. Sometimes the symptoms are obviously cerebral—rigidity of the neck, Kernig sign, violent headache, and tenderness of the eyeballs, and the patient assumes the attitude of the hammer of a gun. But the true meningeal syndrome, which is met with only in pernicious attacks of the convulsive type, is marked by sudden epileptiform convulsions and loss of consciousness, but without the initial cry, and usually without relaxation of the sphincters; extreme rigidity of the neck and retraction of the head, Kernig sign, along with all or any of the usual symptoms of meningitis: finally a state of coma, during which the temperature rises continuously and which may be interrupted by delirium and a renewal of convulsions. If the case be not energetically treated death rapidly supervenes: if the case be successfully treated there may be tardy sequelae.

The authors detect an analogy between malarial and syphilitic meningitis.

A. A.

- i. LEGER (Marcel). **Accès convulsifs remplaçant les frissons dans le paludisme primaire à *Plasmodium praecox*.**—*Bull. Soc. Path. Exot.* 1918. May. Vol. 11. No. 5. pp. 364-366.
- ii. PARROT (L.). **Eclampsie infantile et paludisme.**—*Ibid.* July. No. 7. pp. 560-561.

i. The author describes the case of a little girl of four years where an alarming seizure of convulsions was found, after careful exclusion of all other possibilities, to be due to an infection with *Plasmodium praecox*.

ii. The author draws attention to the fact that eclampsia is a well-known symptom in the malaria of infants. Such eclampsia at the onset of a paroxysm is merely an infantile manifestation of the ordinary rigor; but when it occurs later—which happily is a rare event—it is a serious symptom indicating a pernicious form of malaria.

A. A.

STEPHENS (J. W. W.), YORKE (W.), BLACKLOCK (B.), MACFIE (J. W. S.), COOPER (C. Forster) & CARTER (H. F.). Studies in the Treatment of Malaria. VII. Oral Administration of Quinine Sulphate daily over Prolonged Periods, in Simple Tertian Malaria. VIII. Oral Administration of Quinine Sulphate for Two Consecutive Days Weekly over Prolonged Periods, in Simple Tertian Malaria. IX. A Comparison of the Results of Interrupted and Continuous Quinine Administration. X. Oral Administration of Quinine Sulphate Grains 120 on Two Consecutive Days only, in Simple Tertian Malaria. XI. Oral Administration of Quinine Sulphate Grains 90 on Two Consecutive Days Weekly over a Period of Three Weeks, in Simple Tertian Malaria. XII. At what Time after Cessation of Quinine Treatment do Relapses occur in Simple Tertian Malaria? XIII. Oral Administration of Quinine Sulphate Grains 90 on Two Consecutive Days only, in Simple Tertian Malaria. [Second Series.]—*Ann. Trop. Med. & Parasit.* 1918. May 11. Vol. 11. No. 4. pp. 309-330; 331-358; 359-363; 417-419; 421-423; 425-441. With 10 charts; and July 25. Vol. 12. No. 1. pp. 71-77.

vii. The primary object of the work here recorded was to investigate the radically curative—as distinguished from the palliative or temporary-curative—value of prolonged quinine treatment. The subjects of investigation were men who had been infected in Macedonia at least six months before and had been given more or less quinine during that time. The method was to compare the effect upon parasites and upon temperatures of quinine sulphate given in solution by the mouth in specified amounts for divers terms.

It is not possible to give an abstract of a paper that consists mainly of tabulated statistics, but the final table of comparisons gives a sufficient summary of the results.

Quotidian Dose in Grains.	Duration of Treatment in Weeks.	Number of Cases.	Number of Cases Relapsed.	Number of Cases not Relapsing but observed for less than 60 Days.	Percentage of Cases Relapsed.	
					Min.	Max.
20	14-15	5	3	1	60	80
30	5-18	14	10	0	71	71
30		29	24	5	79.3	100
30	3					
45	1	22	17	1	77.4	81.8
45	3-8	19	7	3	36.8	52.6

The conclusion is that the continuous dose of 45 grains gave the best results in these cases of single tertian.

Practically all the cases were able to take a daily dose of 20-30 gr. for 8 weeks or more, but only 7 out of 19 cases were able to stand a daily dose of 45 grains for 8 weeks.

viii. An investigation of the effects of interrupted quinine treatment in simple tertian malaria. Quinine sulphate solution was given by the mouth in doses ranging from 10-15-30-45 grains on two

consecutive days a week for terms of 8 weeks or more. The subjects were men who had been infected in Macedonia at least 6 months before and had had more or less quinine during that time. The paper consists almost entirely of statistical tables and charts.

As regards curative effect (i.e., number of cases not relapsing within observation limits of less than 60 days) the best results were observed with the 45 grains treatment. This treatment—45 grains in tripartite doses on two consecutive days weekly for 8 weeks—all the 29 subjects treated stood without difficulty.

ix. In this paper the statistics of the two antecedent papers are compared, and the following conclusions from them are stated:—

That interrupted treatment with 30 or 45 grains of quinine twice weekly is preferable to continuous treatment with those amounts every day of the week; and that 45 grains twice weekly is better than 30 grains twice weekly or than 30 grains daily, both as a palliative and as a curative treatment.

x. In investigating *inter alia* the limits of human endurance of quinine, the authors put 15 subjects of chronic benign tertian on a two days course of the sulphate. It was given in solution by the mouth every four hours in eight 15-grain and four 30-grain doses so arranged as to make an aggregate of 120 grains a day, or 240 grains for the two days.

In 5 of the 15 cases the course had to be stopped, owing to the development of serious symptoms—vomiting, deafness, dimness of sight, temporary blindness, collapse—which, however, did not persist beyond a week: in the other 10 cases the course was completed, but in the majority of instances with less serious symptoms of the like kind. The authors therefore conclude that the quinine regimen above specified “represents the maximum amount of the drug which can be tolerated by the average case.”

As regards the effects of these enormous doses: relapses occurred in 60 per cent. of the 10 cases that completed the treatment.

xi. 24 cases—men infected in Macedonia at least nine months before and having had more or less quinine during that time of simple tertian were treated with quinine sulphate in 30 grain doses three times daily for two consecutive days a week during a term of three weeks. The blood was examined daily in every case.

In 11 cases a “parasite relapse” occurred in 3 to 57 days. In 12 cases there was no “parasite relapse” within an observation term of 60 to 108 days, and in 1 case within an observation term of 32 days.

In some of the cases deafness, in others dimness of vision was complained of. Buzzing in the ears, giddiness, vomiting, and tremors were “fairly pronounced.” In no case did any ill effect persist for more than a few days. One case had an attack of blackwater fever after the first dose; but the symptoms disappeared in two days, and resumption of quinine was not followed by haemoglobinuria.

xii. From an analysis of the records of 405 cases treated and very exactly observed by themselves the authors suggest an answer to the practical question—how long after the cessation of treatment is it necessary to keep cases of simple tertian malaria under observation in hospital so that fear of relapse after discharge may be reasonably small?

As the paper consists of tables of statistics with specific commentaries it cannot be condensed. But the general conclusions drawn by the authors from their figures are, that if there has not been a relapse and they restrict the meaning of the term "relapse" to a febrile paroxysm coinciding with the *appearance of parasites* in the peripheral blood—within four weeks of cessation of treatment the risk of relapse after discharge from hospital is about 13 per cent. and if there has not been a relapse within six weeks of cessation of treatment the risk of relapse after discharge is reduced to 5 per cent xiii. The authors have already published [see this *Bulletin*, Vol. 11 p. 298] statistics of 76 cases of simple tertian malaria treated for two days with a daily dose of 90 grains of quinine sulphate, those statistics recording 29 relapses in which parasites were seen. The present paper gives statistics in fuller detail of other 89 cases treated in the same way; but of these 89 cases 84 relapsed, with reappearance of parasites, after intervals ranging severally from 12 to 53 days. There is thus a remarkable discrepancy in the two sets of results, which the authors propose to discuss in a subsequent paper.

A. A

CARDAMATIS (Jean P). **Mode d'action de la quinine sur les diverses formes d'hématozoaires; traitement prophylactique et curatif le plus efficace du Paludisme.**—*Bull. Soc. Path. Exot.* 1918. July. Vol. 11. No. 7. pp. 648-662.

This is a summary of clinical experiments and laboratory investigations carried on during eight years (1890-97 *sic*) in various highly malarious parts of Greece.

As regards the observed effect of quinine on the parasites, generally the protoplasm degenerates first, becoming vacuolated and losing its capacity for stain, and the chromatin mass degenerates later. The older schizonts after breaking up are absorbed by the large uninuclear leucocytes, though streaks of degenerated protoplasm may remain in the infected red blood corpuscles. The nucleus of male crescents is extremely resistant. *P. vivax* is the most susceptible species, quinine having an immediate effect on the young forms even when given in small doses: the general destructive effect of 50 cgm. given by the mouth is slight; with 1 gm. degeneration of protoplasm is noticeable in 5 hours, but the chromatin mass is intact at the end of 24 hours; with 1.50 gm. destruction begins after 50 minutes and is complete in 6 or 8 hours, except in the case of some of the gametocytes. But *P. malariae* is more resistant, and *P. praecox* is still more resistant, in all stages, particularly the nucleus of the male crescent: crescents are affected only after prolonged quinine treatment.

As regards the curative effect of quinine the author's summary, which occupies 8 closely printed pages, cannot be condensed. It must be sufficient to state that his experiments are diversified and precise, and to describe the methods of administering quinine that proved the most successful in his experience.

In one series of 480 cases, including both simple infections of all three species and mixed infections, the most successful of 5 methods of treatment adopted was that where 1 gramme of quinine was given daily for 15 days from 4 to 6 hours before a paroxysm: the percentage

of "radical cures" by this method is given as follows:—for *P. praecox* infections 40, for *P. malariae* 45, for *P. vivax* 55. In another series of 144 similar cases, treated in groups by different methods as in the first series, the most successful method was the administration of 1.50 gramme of quinine daily, for 12 days, 8 hours before a paroxysm: the percentage of radical cures was for *P. praecox* infections 68, for *malariae* 70, for *vivax* 87.

But the treatment which the author describes as giving "literally miraculous results" was the following:—at the sweating stage 1.60 gramme of quinine in two doses separated by an interval of an hour: then for 15 consecutive days 1.50 gramme daily 7 or 8 hours before a paroxysm: then, after an interval of 4 days, 1 gramme every evening at bed-time for 8 consecutive days: then, after an interval of a week, 1 gramme every 6th or 7th day for 2 months (*vivax* infections) or 3 months (*praecox*, or mixed infections). Thereafter, in summer or autumn, when there is a risk of re-infection, the convalescent is put on prophylactic treatment of 0.50 to 0.60 gramme every three days. The author states that the rigorous execution of this method gave 98 per cent. of radical cures.

The author attaches supreme importance to the time of giving quinine, namely 8 or 7 hours before a paroxysm, so that the act of schizogony and the moment of maximum absorption of quinine synchronize.

The author allows that there are exceptionally grave cases where larger doses of quinine must be given and by more rapid methods than per os, but he thinks that in ordinary practice administration by mouth is quite as good as any other method if the digestive functions of the patient are in good order.

It should be mentioned with regard to the author's statistics that he does not in this paper define the term "radical cure."

A. A.

Ross (Ronald). **An Interim Report on the Treatment of Malaria. Abstract of 2,460 Cases.** War Office Investigations.—*Trans. Soc. Trop. Med. & Hyg.* 1918. Mar. & Apr. Vol. 11. Nos. 5 & 6. pp. 179–200. **Report of the Treatment of Malaria. (Abstract of 2,460 Cases—War Office Investigations.) Discussion and Additional Remarks.**—*Indian Med. Gaz.* 1918. July & Aug. Vol. 53. Nos. 7 & 8. pp. 241–249; 292–293.

This interim report deals with the various methods of treatment of malaria tested at four large hospitals in the south of England, and includes 2,460 cases, mainly chronic benign tertian contracted at Salonica. It contains an imposing array of figures all duly tabulated, but it is obvious that their comparative values are both unequal and uncertain.

The report bears steady testimony to the value of quinine, but seems to give only moderate countenance to the advocates of enormous doses quickly consummated.

Of the many variations of treatment tested the most successful appears to be that by quinine sulphate given in a single dose daily 4 hours before the anticipated rigor, in solution by the mouth, the dose being 20 grains gradually reduced to 10 grains, and the treatment

being continued for a term of $2\frac{1}{2}$ months. Of 40 cases so treated none relapsed during continuance of treatment ($2\frac{1}{2}$ months): the subsequent history of the patients however "has not yet been determined," although the treatment is described as an attempted "sterilization," aiming at permanent cure.

The next most successful method seems to have been that by 10 grains of quinine sulphate dissolved in hydrobromic acid and given by the mouth, in one dose daily, for an average term of 30 days: of 151 cases so treated 12 relapsed during or very shortly after the cessation of treatment. Almost equally good results followed treatment by 20 grains dissolved in hydrobromic acid given (in two doses) on two consecutive days of each week for an average term of 48 days, the patients being allowed out and doing their route marches: of 262 cases so treated only 22 relapsed while under treatment. Both these modes of treatment are described as being merely prophylactic against relapses.

Attempts to "sterilize" patients by enormous doses of quinine do not seem to have been very encouraging. There were 25 relapses (extremes 10 and 116 days) in 109 cases treated with 100 grains of quinine bihydrochloride daily (60 gr. by intramuscular injection + 40 gr. by mouth) for three days, followed by 60 gr. daily (by mouth) for ten days, and then by 20 gr. daily (combined with strychnine, arsenic, and iron) for fourteen days more. And again there were 30 relapses (extremes 9 and 28 days) in 154 cases treated with quinine sulphate in doses of 40, 60, and 80 gr. respectively on three consecutive days, or 20, 40, 60, and 80 gr. respectively on four consecutive days, the quinine being dissolved in hydrobromic acid and administered in five doses per diem.

The "sterilizing" or permanently curative treatment which the author apparently considers to have been the best for the old cases of malaria under report is the following, devised by Capt. Meredith HARRISON: Quinine bihydrochloride by intramuscular injection 15 grains simultaneously in each deltoid, with 10 grains of hydrochloride by mouth three times daily, i.e., 60 grains of quinine daily. for 12 days, the patient remaining in bed for the 12 days: thereafter for another three days, during which the patient is allowed up, 60 gr. of quinine hydrochloride daily in an anticachexia mixture containing *inter alia* iron, strychnine, arsenic, nitrohydrochloric acid, and mag. sulphate: and thereafter for fourteen days, during which the patient is doing light work, 20 gr. of quinine hydrochloride daily in the anticachexia mixture. Of 49 cases so treated 5 relapsed—extremes 16 and 72 days—within a term of observation that might have extended in some cases to 145 days, though individual dates are naturally not given in any instance in this interim report.

Staff-Sergeant NIERENSTEIN appends a provisional report on excretion of quinine, which embodies the results of 1,366 analyses of 624 different specimens of urine. Here it is stated that, so far as it is possible to generalize, there seems to be a tendency for the excretion of quinine to reach a concentration of 7 to 11 grains per litre of urine—and this for all the salts experimented with, except the lactate, and irrespective of the mode of administration, whether intramuscular, or intravenous, or by mouth.

THOMSON (John D). *Quinine in Malaria: Its Limitations and Possibilities.*—*Trans. Soc. Trop. Med. & Hyg.* 1918. Mar. & Apr. Vol. 11. No. 5 & 6. pp. 229–231.

This paper while not purporting to be a minute criticism of the Ross Interim Report, which it allows may be useful for the guidance of medical officers dealing with army cases in the gross, draws attent on to some deficiencies of sweep and shortcomings of observation that detract from the scientific value of the report.

It points out that in the management of the individual case, in civil life, there must be accurate knowledge not only of the present condition (complications and sequelae) but also of the past history (in respect of relapses) and past treatment (particularly in respect of quinine); and that in the actual giving of quinine *timing* is the first essential, bearing in mind that it is in the act of schizogony that the merozoites, being free in the plasma or merely attached to the red corpuscles, are most vulnerable. It thus emphasizes the view that in every instance accurate observation of the parasite is a primary condition of success; and it pleads that those cases where quinine given indiscriminately may be more toxic to patient than to parasite are just those in which quinine may still be successful if it be given in such a way (e.g., by intravenous injection of minimal doses at or about the moment of schizogony) as to exercise its full and direct effect upon the parasite.

The questions of quinine-elimination and quinine-fastness are briefly referred to, and the author thinks there is a real danger of the parasites becoming inured to quinine by large doses of the drug.

The author's considered opinion, with regard to the treatment of chronic malaria, is that indirect means of getting at the parasites are more promising than direct frontal assault by what are known as sterilising methods; and for the furtherance of these indirect attacks he advocates steady investigation of the following points:—the cause of relapses, not only with a view to preventing them, but also with a view to provoking them, without depressing the patient, so as to clear out the latent forms; the nature of malarial toxins set free by schizogony, with a view to neutralizing them; and the factors that influence the patient's natural powers of resistance.

The paper though full of thoughtful suggestions is by no means sicklied o'er with a pale cast of thought.

A. A.

EUGLING (Max). *Leitsätze der Malariabehandlung.* [Principles of Malaria Treatment.]—*Wien. Klin. Woch.* 1918. Mar. 28. Vol. 31. No. 13. pp. 357–360. With 2 figs.

The author who, has been "Malaria Inspector" in Albania for two years, gives here in sections numbered 1 to 16 detailed instructions for the treatment of malaria. His method of giving quinine, over nine weeks, is so complex that it is illustrated schematically. It is an interrupted method, and in severe cases an injection of salvarsan is given on the 7th, 14th and 21st days.

A. G. B.

JOHNSTON (C. A.). *Treatment and Prophylaxis of Malaria.*—*Brit. Med. Jl.* 1918. May 25. pp. 586-587.

The author seventeen years ago advocated the hypodermic injection (*not* intramuscular) of quinine in malaria, and still adheres to it. If the injection is carried out with rigid precautions against sepsis, and is truly hypodermic, and if the amount of quinine injected is not too large, there are no untoward results and the pain is transient. The author is accustomed to inject 4 grains of bisulphate in a syringe of saline solution once daily for five consecutive days in alternate flanks, and concurrently to give by the mouth every morning $\frac{1}{20}$ gr. of arsenious acid and 5 grains of quinine well diluted. The latter part of the treatment he continues for a month.

The author gives reasoned arguments against the use of quinine as a prophylactic for malaria, though, like so many other writers, he does not make it quite clear whether he refers to the prevention of infection, or to the prevention of relapses, or to both. He considers that the only prophylactic is a daily dose of $\frac{1}{30}$ gr. of arsenious acid

A. A.

RAYSON (H. Knight). *A Plea for Routine Subcutaneous Injections of Quinine in Acute Malaria.*—*S. African Med. Rec.* 1918. May 11. Vol. 16. No. 9. pp. 138-139.

The author's routine treatment of acute malaria is to inject a solution of the bisulphate of quinine at blood-heat into the subcutaneous tissue of the upper part of the arm. Two injections of 5 gr. each, or one of 10 gr. followed by another of 5 gr., dissolved in 20 to 30 minims of distilled water are usually sufficient. In the majority of cases the patient suffers no particular inconvenience: sometimes there is a little local inflammation, which quickly yields to treatment, but never in the author's large experience goes on to any extensive sloughing. The author has now abandoned intramuscular injection.

A. A.

GRÉHANT (Stéphane). *Note sur le traitement du paludisme.*—*Bull. Acad. de Méd.* 1918. May 14. 3 Ser. Vol. 79. Year 82. No. 19. pp. 372-373.

The author describes the method of treating malarial fever that he has practised for nine years in Africa. Every patient whose temperature rises to 39° C. receives, if there be no albuminuria, an intramuscular injection of 0.75 to 1 gramme of quinine sulphate daily for three consecutive days. In the event of a relapse this treatment is repeated.

A. A.

ROCHE (Maurice). *Some Observations on the Nature and Treatment of Malignant Malaria in East Africa.*—*Jl. Trop. Med. & Hyg.* 1918. Aug. 15. Vol. 21. No. 16. pp. 165-170.

A discursive account of the author's experiences and impressions of malaria in East Africa. The author states in conclusion that "African malignant malaria has been completely eradicated quickly

and easily by means of quinine intramuscular injections spread over a month. Sixty grains of bihydrochloride were given by eight injections each of $7\frac{1}{2}$ gr."

A. A.

WRIGHT (E. Hasell). **Treatment of Malaria by Quinine. Failure of "Splenox."**—*Indian M. d. Gaz.* 1918. July Vol. 53. No. 7. pp. 252–258. With 4 charts.

A feature of this paper is the careful report of two cases of malarial fever—a quartan and a benign tertian infection—where a fair trial, in accordance with specified directions, was given to the asserted remedial claims of a mixture styled splenox (*Indian Medical Gazette*, July, 1917). In neither case did the enigmatical mixture have any effect on the parasites or modify the character of the fever, in contrast with subsequent treatment by quinine.

For the rest, the paper is a critical review of established propositions regarding the use of quinine in treatment and prophylaxis. The author mentions two cases in which even small doses of quinine caused alarming symptoms of poisoning: both cases have been under his observation for many years and neither is subject to malarial attacks. As regards intramuscular injections, success depends upon rigid asepsis, free dilution, deep injection, and subsequent massage. The author speaks well of DENNYS' mixture for reducing the enlarged spleen and also in prophylaxis [see this *Bulletin*, Vol. 8, p. 357].

A. A.

FALCONER (A. W.) & ANDERSON (A. G.). **Notes on the Treatment of Subtertian Cerebral Malaria with Quinine and Galyl.**—*Jl. Roy. Army Med. Corps.* 1918. July. Vol. 31. No. 1. pp. 83–89.

Notes of nine grave cases of malignant tertian—six of them grave cerebral cases—in the treatment of which galyl was employed. All the six cerebral cases had had quinine without clinical improvement: in all, except one that ended fatally, the clinical improvement after administration of galyl was immediate and striking. In the other three cases—one of which was considered unsuitable for treatment with quinine—the general condition was greatly improved and the parasites were diminished in number after galyl.

The authors conclude (1) that the treatment is in itself free from danger; (2) that in subtertian malaria which is resisting adequate quinine treatment, or where the condition is alarming, the results of combined galyl and quinine treatment have been encouraging enough to justify a further trial. It must be understood, however, that the use of galyl in no way abates the necessity for quinine; and (3) that where quinine is interdicted by some idiosyncrasy galyl may be a valuable substitute.

A. A.

GAUDIOSI (E.). **Cura della malaria e complicazioni da chinino.** [The Treatment of Malaria and its Complications with Quinine.]—*Ann. Med. Nav. e Colon.* 1918. May-June. Year 24. Vol. 1. No. 5–6. pp 371–382.

A recommendation of the methods of PENDE and BARBARY for the treatment of obstinate malaria in naval and military hospitals.

[For PENDE's method see this *Bulletin*, Vol. 11, p. 25.] The injections are given every 5 days until six have been given, and are then suspended. Hypodermic injections of chinarsol (disodic methylarsenate) are given, in addition, between the doses of quinine. J. B. Nias.

PONTANO (Tommaso). **Nuove vedute sulla terapia specifica delle malattie protozoarie. (Nota preventiva a proposito della chinino-resistenza dei parassiti malarici.)** [New Views on the Specific Treatment of Protozoal Diseases. Preliminary Note on Quinine-Resistant Malarial Parasites.]—*Polichinico*. Sez. Prat. 1918. June 9. Vol. 25. No. 23. pp. 533-537.

In this paper the author deals with the problem of quinine-resistant malarial parasites. He finds by experience that an alteration in the mode of administration is sufficient to overcome this resistance; that is to say, when patients, who have been treated, without success, with 2-gramme doses daily of hydrochlorate of quinine by the mouth, are submitted to hypodermic or intravenous medication with one-gramme doses only, or even less, their symptoms promptly subside. The path, by which the quinine enters the circulation, therefore seems to modify its action. The author found, amongst his patients in Macedonia, about 10 or 11 per cent. refractory to quinine when given by the mouth, but they were all cured easily by hypodermic or intravenous administration of the same, or even lesser doses.

J. B. N.

ARCHER (G. J. Stoney). **A Simple and Effective Method of giving Quinine to Malarial Cases in order to prevent Relapses.**—*Jl. Roy. Army Med. Corps*. 1918. May. Vol. 30. No. 5. pp. 521-522.

The author records his personal experience of the good effects of systematic administration of quinine after discharge from hospital to duty. In every case the C.O. and M.O. of the unit to which the man belongs are notified that the man has been in hospital for malaria and requires after-attention to prevent relapses. The after-treatment recommended is 10 grains of quinine three times a day for three consecutive days three times a month—e.g., 1st-3rd, 11th-13th, 21st-23rd, dates easy to keep in mind. This procedure is to be continued for three months.

A. A.

ROSS (T. S.). **The Prevention and Treatment of Malaria.**—*Indian Med. Gaz.* 1918. Apr. Vol. 53. No. 4. pp. 134-136.

An interesting discourse, though not containing anything new. The author has always used sugar-coated tabloids of quinine and has never found them to resist solution in the alimentary canal, an unusual experience which he attributes to his custom of giving them at bedtime. He has also been fortunate in never having seen any ill effects from intramuscular injections of quinine, and this he attributes to rigid asepsis, to the use of the bihydrochloride, and to the assurance that the injections were intramuscular and not subcutaneous.

GUNSON (E. B.), WINNING (F. W.), JOHNSTONE (G. A.), PORTER (J. H.) & SCOTT (G. B.). **The Treatment of Severe Relapsing Cases of Malaria.**—*Lancet*. 1918. June 22. pp. 866-869. With 5 charts.

A group of 90 cases of severe chronic malaria not controlled by quinine *per os* were put on two intensive courses of quinine—intramuscular gr. 20, by mouth gr. 20, intramuscular gr. 20, daily, for four days, repeated after an interval of ten days. The result was immediate, progressive, and striking improvement in all cases; relapses occurred in 44 per cent., within 4 weeks, but were considerably less severe and were completely controlled by quinine given by the mouth.

Another lot of 552 less severe cases were treated during the apyrexia period, as follows:—

368 without quinine, of which 46 per cent. relapsed within 3 weeks: 94 with 20 gr. of quinine on Saturdays and Sundays, of which 10 per cent. relapsed within 3 weeks: 90 with 20 gr. of quinine daily, of which 8 per cent. relapsed within 3 weeks.

A. A.

BOUYGUES (Julien). **Le paludisme macédonien; son traitement combiné par la quinine et les ferments métalliques.**—*Presse Méd.* 1918. May 13. Vol. 26. No. 27. pp. 244-246. With 4 charts.

The forms of malarial fever that have come most under the author's observation in Macedonia are the continuous remittent and the irregular aperiodic. Though quinine in daily doses of 3 grammes is usually specific in the febrile stage, the author has found quinine of little use in the intervals. Some of the quinine-resisting cases are found to have albumen in the urine, and if the patient then be put on a regimen of milk the quinine may be continued with good effect. In other cases the failure of quinine is due to gastro-hepatic trouble, and here the author advocates combined treatment with quinine and metallic colloids (metallic ferments).

The immediate effect of an intravenous injection of any of the "metallic ferments" is to produce a typically-malarial febrile paroxysm with a much exaggerated sweating stage. The after effect is seen in a fall of temperature of some duration, and in a marked improvement of the general condition of the patient. The ultimate effect is always to attenuate the infection.

The author has found that, clinically, intravenous injections of colloidal gold, electraural (colloidal gold), and collargol have an identical reaction: they precipitate an artificial crisis, with abundant sweating and polyuria.

The author describes the manner of preparation of colloidal gold, etc., and alludes briefly to some of the physiological effects of "metallic ferments"; but nothing is said about dosage or clinical technique. The only contra-indication to their use is a weak heart.

A. A.

ROUX (F.). **Traitement du paludisme par les injections intraveineuses de colloïdase de quinine.**—*Presse Méd.* 1918. June 27. Vol. 26. No. 36. pp. 333-334. With 1 chart.

The author recommends colloidal quinine for those old cases of chronic malaria where the usual methods of quinine treatment are

disappointing. It should be given, exclusively by intravenous injection, in $2\frac{1}{2}$ to 5 milligramme doses, a few hours before the expected paroxysm if possible, every day or every second day, up to four injections. The injection is generally followed by a reaction the symptoms of which are varied—much shivering, rise of temperature, vomiting, headache, deep sleep.

A. A.

HARSE (W. T.). **The Dosage of Quinine for Malaria.** [Correspondence.]—*Med. Jl. Australia.* 1918. May 11. Vol. 1. 5th Year. No. 19. p. 401.

This writer has considered the statement that quinine does not kill the malaria parasite unless given in doses large enough to make a strength of 1 in 5,000 in the blood, and he cannot reconcile it with his clinical experience that repeated small doses—e.g., 2 or $2\frac{1}{2}$ grains of bihydrochlorate every two hours is a very effective method of treating malarial fever.

A. A.

AGUIRRE PLATA (Carlos). **Inyecciones intravenosas de quinina.** [Intravenous Injections of Quinine.]—*Repert. de Med. y Cirug.* 1917. Aug. Vol. 8. No. 11. (No. 95). pp. 497-501.

The author recommends quinoform (basic formate of quinine), for intravenous injection, in preference to both the basic hydrochlorate and the bi-hydrochlorate, as being less irritant to the walls of the vessels, and so less liable to cause thrombosis. The dose is 5 centigrammes dissolved in 2 cc. of distilled water. Notes are given of 11 cases in which the drug was successfully so employed.

J. B. N.

DOMENICO (Giannelli). **Sulla terapia della malaria.** [Treatment of Malaria.]—*Policlinico.* Sez. Prat. 1918. June 16. Vol. 25. No. 24. pp. 562-564.

A plea for the establishment of special hospitals for the treatment of soldiers, suffering from malaria, by specialists competent to give endovenous injections of quinine. The author finds that a single dose of 1.25 grammes of hydrochlorate of quinine, given in this manner, will almost invariably terminate any case of recent origin.

J. B. N.

BECHER (E.). **Ueber das Verhalten des Pulses im Malariaanfall, ein Beitrag zur Kenntniss des Fieberpulses.** [The Behaviour of the Pulse in an Attack of Malaria.]—*Deut. Arch. f. Klin. Med.* 1918. Apr. 16. Vol. 125. No. 4-6. pp. 460-476. With 5 charts.

The author has studied during the attacks the frequency of the pulse, its character and the sphygmogram, with the systolic and diastolic blood pressures, as a rule half hourly, in 25 malaria patients. The following are some of his conclusions—The pulse frequency in the attack is not rarely relatively slowed. The systolic pressure rises moderately in the rigor stage and sinks below normal in the hot and sweating stages. The diastolic pressure may remain pretty constant

throughout the attack ; it usually falls fairly strongly after the rigor and then rises again. Owing to the rise of systolic pressure in the rigor and the fall of diastolic pressure shortly after the amplitude increases ; towards the end of the attack it becomes less. A few hours after an attack the blood and pulse pressures are normal. Dirotism of the pulse may appear in the rigor ; it becomes more evident in the hot stage.

A. G. B.

- LAWSON (Mary R.). **Aestivo-Autumnal Malaria. The Extracellular Relation of the Crescentic Bodies to the Red Corpuscle and their Method of Securing Attachment.**—*Jl. Experim. Med.* 1918. June 1. Vol. 27. No. 6. pp. 739-748. With 3 plates & 2 text-figs.

This author asserts, contrary to received experience, that aestivo-autumnal parasites "pass through a sexual cycle in the human host, with the formation of flagella by microgametocyte, fertilization of the macrogamete, and its subsequent segmentation." She also asserts that crescents attach themselves to the red corpuscles by pseudopodia, and that the portions of the red corpuscle thus encircled and engulfed are ultimately dissolved by the crescent, whereby there comes to pass that vacuolation of the crescent which other observers have mistaken for degeneration. Such tricks hath strong imagination in apprehending the forms of things seen in films of malarial blood.

A. A.

- TRIBONDEAU (L.). **Sur la coloration de l'hématozoaire de Laveran.**—*Bull. Soc. Path. Exot.* 1918. June. Vol. 11. No. 6. pp. 440-443.

The author describes his method of fixing and staining films of malarial blood. His description which occupies $3\frac{1}{2}$ pages cannot be condensed. The alcohol used for fixation is flamed off. The stain is an eosinate-methylene blue dissolved in alcohol and glycerine. After staining the washed film is dried through a flame and then washed with a watery solution of alcoholic tannin slightly camphorated against mould. The results are said to be as good as Giemsa or other bi-eosinate methods.

A. A.

- BAUR (Jean), BOCCA & TULASNE. **Résistance globulaire, paludisme et quinine.** *Bull. et Mém. Soc. Méd. Hôpît. de Paris.* 1918. Mar. 21. 3 Ser. Vol. 34. No. 9-10. pp. 250-252.

The authors' experiments and observations, with corpuscles freed from plasma, confirm the statements (1) that globular resistance is lessened in malaria, the diminution being intensified by quinine, and (2) that quinine has a haemolytic action.

A. A.

- INDIAN MEDICAL GAZETTE. 1918. July. Vol. 53. No. 7. pp. 261-266.
—**The Quest for Quinine.**

This interesting paper very appositely combines a review of a chapter in Admiral Sir A. H. MARKHAM's *Life of Sir Clements Markham*, entitled "The Quest for Cinchona," with a brief account of the progress

of cinchona cultivation in Bengal, with the origins of which the last-named member of this distinguished family was intimately connected.

After a reference to well-known stories of the discovery of bark and its introduction into Europe [several of which are summarised in this *Bulletin*, Vol. 8, pp. 29-30], the unsuccessful attempt of LA CONDAMINE and JUSSIEU to send seedlings of *C. condaminea* to Paris in 1738 are noticed, and a fitting tribute is paid to the immortal memory of WEDDELL (1843-45) who carried seeds of *C. calisaya* from Peru to France and thus brought the exotic cultivation of the plant into existence. From this very stock imported by WEDDELL much of the present progeny of the cinchona plantations of Java and Bengal can trace descent.

With respect to cinchona cultivation in India, much had been thought as early as 1819 and about 1852; unsuccessful consignments of seeds and plants were actually received in that country. In 1859 Clements MARKHAM, who had already travelled privately in Peru, was appointed by the East India Company to make arrangements for collecting plants in S. America and transferring them to India. With great discretion MARKHAM projected three simultaneous expeditions to S. America, one in charge of Dr. SPRUCE with a professional gardener named CROSS as assistant, one under PRITCHETT, and one under his own leadership with a botanist named WEIR as his assistant. The first expedition sent home 600 plants and 100,000 seeds of *C. succirubra*, some of which eventually reached India safely in charge of CROSS. The second expedition also was productive. MARKHAM himself after overcoming many natural difficulties and much official obstruction succeeded in shipping several hundred plants in Wardian cases; but they were transhipped to India in September and thus were exposed to the autumnal terror of the Red Sea, and were subsequently detained in Bombay, so that when they reached the Nilgiri Hills they were dead or dying. In due course MARKHAM had gone out to India to initiate the cultivation of cinchona in the Nilgiris; but in April 1861 the only plants alive in India were six *C. calisaya* brought by CROSS, 463 *succirubra*, and some worthless *C. micrantha*.

The main components of the infant plantations of India were plants brought from Java by Dr. T. ANDERSON, Superintendent of the Calcutta Botanic Garden, in 1861: these were the issue of a single specimen of *C. calisaya* that had become established in Java, that specimen having been raised from seed brought to Paris by WEDDELL. At the present day, however, the most useful trees in the Bengal plantations are *C. ledgeriana* and some of its hybrids, this being a peculiarly fine variety of *C. calisaya* brought from S. America by Charles LEDGER, in 1865.

The principal source of Indian bark just at present is the Munsong plantation of 9,000 acres, in the Kalhmpung subdivision of the Darjeeling district which was started in 1900, the original plantation at Mungpo, which was opened in 1864, being now worn out and in the preparatory stages of renovation.

With an eye to more extensive cultivation of cinchona, Lt.-Col. A. T. GAGE, the present Superintendent of the Calcutta Botanic Garden, has recently been exploring India and Burma, and has provisionally selected a hilly forest tract of 400 square miles between

the Tavoy River and the frontier of Siam, many parts of which appear to be suitable for the purpose.

As regards the extraction of alkaloids, the factory established on the Bengal plantation at Mungpo, under C. H. WOOD as quinologist, was at first content the isolation of quinine being a jealously-guarded trade secret to produce a non-crystalline extract of red-bark, composed of a mixture of the alkaloids, known as Cinchona Febrifuge. In 1888 Mr. J. GAMMIE (unfortunately referred to here as Gemmie) an original genius "optime meritis, incuriosus si quis alius famae," whose reputation seems never to have penetrated the mists of the Darjeeling hills, discovered for himself the secret of the extraction of quinine, and thereafter a certain amount of that alkaloid was produced locally, though the manufacture of the cinchona febrifuge was continued also. Lately the official post of Quinologist, which had not been filled up when WOOD retired in 1879, has been revived, and in the hands of a skilled chemist much of the bark now harvested from the plantations of Kalimpong yields as much as 9 per cent. of quinine.

A. A.

WARBURG-Cöln. (F.). Ueber den praktischen Wert der Kalium-quecksilberjodidprobe bei der Chininbehandlung von Malaria-rückfällen. [The Practical Value of the Potassium Mercury Iodide Test in the Quinine Treatment of Malarial Relapses.]—*Münch. Med. Woch.* 1918. May 28. Vol. 65. No. 22. pp. 591-592.

The author has treated at Cologne 250 malaria cases, relapses with few exceptions; 70 per cent. were tertian and 30 per cent. subtertian. Some of the cases were very resistant to quinine and the K Hg I urine test showed that they excreted quinine badly: if however quinine administration was suspended, and especially if methylene blue or salvarsan or "solarson" was given in the intervals, the excretion very often improved. These results confirm those of TEICHMANN and NEUSCHLOSZ [see this *Bulletin*, Vol. 11, pp. 21 and 25], to which objections were raised by GIEMSA and HARTMANN [*l.c.* p. 299]. Further investigations showed that the diminished excretion did not occur in all patients habituated to quinine but only in those who were refractory to it. When the excretion improved the quinine regained its activity. It seemed almost, he writes, as if a good effect of quinine in malaria went parallel with the quantity and duration of its excretion in the urine. In practice, he thinks, the treatment of relapses may be controlled by the K Hg I test. If the excretion is shown to be good, the usual quinine treatment may be instituted. If the excretion is low, it must be improved by the cessation of quinine and the use of the other remedies, after which quinine is resumed. He has thus obtained excellent results in the treatment of relapsing quinine-resistant cases. [He does not state whether in such cases the quinine had been given by the mouth or parenterally; see this *Bulletin*, Vol. 12, p. 48.]

A. G. B.

GIEMSA (G.) & HALBERKANN (J.). **Der Wert des Kaliumquecksilberjodides zur Ermittlung des Chinins im Harn.** [The Value of the K Hg I Test for Quinine in the Urine.]—*Munch. Med. Woch.* 1918. Aug. 27. Vol. 65. No. 35. p. 972. With 1 chart.

The authors cannot accept the conclusions of WARBURG on the grounds (1) that the K Hg I reaction was not supported by the gravimetric method and (2) that refractoriness to quinine may mean that owing to complications or an unsuitable form of administration the patient is really absorbing little quinine or none at all. Their curves show the fluctuations in quinine excretion in 4 quinine habitués during a period of 32 days. The dissimilarities of the several curves are attributed to differences in diet.

A. G. B.

SCHOLZ (Harry). **Zur Frage der Chiningewöhnung.** [Quinine Habituation.]—*Deut. Med. Woch.* 1918. Aug. 29. Vol. 44. No. 35. pp. 965-966.

With reference to the work of TEICHMANN and NEUSCHLOSS the author estimated the quinine in the urine of 4 chronic cases habituated to quinine and one control [neither process nor figures given] and obtained similar values in all cases. Like results were obtained with the faeces.

A. G. B.

- i. RAMSDEN (W.) & LIPKIN (I. J.). **Detection and Estimation of Quinine in Blood and Urine.**—*Ann. Trop. Med. & Parasit.* 1918. May 11. Vol. 11. No. 4. pp. 443-464.
- ii. LIPKIN (I. J.) & RAMSDEN (W.). **Nephelometric Estimation of Quinine in Blood and Urine.**—*Brit. Med. Jl.* 1918. May 18. pp. 560-561.

'This is a technical paper, the details of which will be consulted by chemists. The authors' summary in i. will give an idea of its contents :—

"1. Procedures are described which greatly increase the delicacy of the Thalleioquin and the Herapath tests for quinine. 2. The turbidity given by Tanret's reagent can be made an exceedingly delicate 'negative test' for quinine, and, with adequate precautions for excluding other substances, into a positive test capable of detecting 1/5,000th mgm. 3. A defaecation process is described for urine which removes no quinine but abolishes ether emulsion troubles, and usually also removes all substances other than quinine which give Tanret turbidity. 4. Commercial ether cannot safely be used for extraction of quinine, whether for qualitative or quantitative purposes, without special purification. An adequate and simple method for such purification is given. . . . 7. A new method of extracting quinine from urine is described—time, labour and material are saved, and the quinine obtained is so pure that it can be estimated by titration. 8. By the use of an adjustable slit to secure variable and equal illuminations greatly increased accuracy is attainable in nephelometry. 9. A new method for nephelometric estimation of quinine in blood is described, delicate enough for use with a few cc. of human blood. The same method serves also for rapid estimations of quinine in urine."

In the section on nephelometric estimation of quinine in blood the authors write :—

“Such clinical estimations of quinine in blood as we have made up to the present suggest that the concentrations attained in chronic malarial subjects are always much lower than in healthy men taking the same dose of the drug in the same way. The question arises whether these lower concentrations are due to ‘habituation’ to quinine (cf. Teichmann), or are from the very beginning characteristic of men who, if infected with malaria, will tend to relapse after relapse, because, owing to some individual idiosyncrasy, a certain minimal concentration of quinine necessary in the blood for complete eradication of the parasite will never be attained. It is a question the solution of which might well afford important indications for prophylaxis and treatment. Now that an adequate method of estimation is available, we hope that other workers who, unlike ourselves, may have access to fresh cases of malaria not previously ‘habituated’ to quinine will contribute to its solution by estimating the blood-quinine in as many of them as possible.”

A. G. B.

JEANSELME & DALIMIER. *De l'élimination de la quinine par les urines.*

—*Presse Méd.* 1917. Aug. 2. Vol. 25. No. 43. pp. 441–442.

With 1 chart.

The authors employed Tanret's iodo-mercuric reaction for the detection of quinine in the urine; thereby, they state, 1/100 of a milligramme can be recognised: the urine must not be albuminous and no other alkaloid should have been taken. After a dose of 1 gm. of the basic hydrochloride quinine appeared in the urine immediately (intravenous injection), in 15–25 minutes (intramuscular or by mouth), excretion coming to an end at the 24th to 60th hour. These results are comparable with those of GAROFALO and KERNER. The rate of elimination is shown graphically in a chart; in each case the curve reaches its acme about 6 hours after the administration. From that point the curve falls rapidly (intravenous or digestive channel), or remains high till the 26th–27th hour (intramuscular channel). Another table shows the results of similar doses repeated once or several times. In 5 out of 6 instances the drug could be found in the urine for 48 hours after the last dose. The conclusion is reached that intravenous or oral quinine should be given daily, intramuscular at 48 hour intervals.

A. G. B.

BAUR (Jean), RÉVEILLET, BOCCA & TULASNE. *Les voies d'élimination de la quinine. (Etude expérimentale.)* *Bull. et Mém. Soc. Méd. Hôpît. de Paris.* 1918. June 28 Vol. 42. Nos. 23–24. pp. 706–707.

A short paper giving, without protocols, the results of researches. Basic hydrochloride of quinine was administered subcutaneously and intravenously to dogs, the quinine being afterwards identified by the thalleioquin reaction, which, the author says, is delicate enough to show the presence of 0.07 mgm. of the salt in two cc. of fluid. The dosage and time elapsing before estimation are not stated. The reaction was always positive in the urine, usually negative in the blood (quantity present below the limits of the reaction), irregular in the bile, never present in the saliva. Stomachal and intestinal contents were positive with doses of 0.2 gm. per kilo; “the digestive

tube is a vicarious organ of elimination "; (quinine is found in human vomit after injection of the drug under the skin). Quinine was found to be fixed in the brain, spleen and liver.

A. G. B.

LAPIN. **Elimination urinaire de la quinine en solution ou en suspension huileuses.** - *Bull. Soc. Path. Exot.* 1918. July. Vol. 11. No. 7. pp. 662-669. With 4 charts.

Owing to the fact that quinine goes through the organism almost without being fixed it has to be given in relatively high doses. Some authors have thought that if its elimination were less rapid its action might be more effective. Hence the trial of oily excipients. To the same end the so-called insoluble salts of quinine were used, but it is noted that all quinine salts are rapidly broken up, diffused, and eliminated. Elimination is slowest where the liver is functioning best; most rapid in the case of hepatic congestion or icterus. One gramme of the salt was injected in each case, and always hypodermically. The pain occasioned lasted about three days but was tolerable. For estimation of the quinine a modified Tanret reaction was used. The author concludes (1) that insoluble salts of quinine injected in oily suspension or solution are eliminated rapidly, but less rapidly than soluble salts in watery solutions; (2) Elimination depends on hepatic rather than renal activity; (3) The duration of elimination in the urine is independent of the dose of quinine, but is prolonged by increase of the amount of oil; (4) as far as the experiments have gone, the duration of elimination is greatest with animal oil (cod liver), least with mineral oil (vaseline), vegetable oil (olive) being intermediate. The author adds that there are difficulties and inconveniences in the use of oil and that elimination is not sufficiently retarded to permit at present of the establishment of a new method of treatment.

A. G. B.

INDIAN MEDICAL GAZETTE. 1918. July. Vol. 53. No. 7. pp. 270-274.
- **Malaria Prevention in Malacca. Lecture on Destruction of Mosquitoes.**

The author deals with the subject from the engineer's standpoint, and advocates a system of drainage which, besides controlling the breeding-grounds of mosquitoes, renders the rich surface-soil of the Malayan valleys available for cultivation. Instead of the customary central drain with lateral herring-bone affluents, he advocates a ditch or drain, cut deep enough to reach bed-rock, on each side of the valley near the natural line of seepage. Larvae breeding in these drains can be dealt with by flushing, automatic or otherwise. Areas not requiring such drainage can be treated by the flooding and automatic flushing method. The author also describes traps for catching adult mosquitoes. These traps are ponds of which the level can be regulated and the surface be kept oiled. He has noticed that such traps may become so covered with mosquitoes and other insects in one night that the pond has to be flushed out and oiled again.

A. A.

HEHIR (P.). **The Prevention of Malaria in Cantonments.**—*Indian Med. Gaz.* 1918. Apr. Vol. 53. No. 4. pp. 130-134.

A critical resumé of approved antimalarial procedure and of the principles upon which it is based. It is an epitome that might well be reprinted and circulated. Its merits are not novelty, but brevity and point.

A. A.

SERGEANT (Edmond) & SERGEANT (Etienne). **La prophylaxie antipaludique d'une armée en campagne (Armée d'Orient 1917).**—*Bull. Soc. Path. Exot.* 1918. July. Vol. 11. No. 7. pp. 641-648.

The authors summarize the antimalarial measures formulated at the Pasteur Institute for the protection of the French Army of Macedonia, under the following heads :

1. Preliminary epidemiological investigations :—

(a) Specific identification of *Anopheles* and exact determination of their breeding-places.

(b) Determination of endemic index (spleen-survey of children).

2. Selection of site :—

Camps to be pitched far from reservoirs of the disease. Flee from marshy plains and from the depths of valleys : choose high-lying sites : avoid the vicinity of infected natives. Remember the dictum of Napoleon that an unhealthy military station is worse than the bloodiest battle.

3. Prophylactic quinine :

Quinine to be given like daily bread to every officer, N.C.O., and man, from 15th April to 1st December : one tabloid of 40 cgm. of hydrochloride immediately before the evening meal.

4. Mosquito-nets :—

Every man to be supplied with a well made mosquito net.

5. General sanitary improvement of occupied localities :—(a) Treatment of breeding-places of *Anopheles*, drainage, clearing, etc.

(b) Quinisation of native population.

6. Protection of dwellings : Screening of windows and doors with wire gauze ; stopping chinks : drying of quarters. All minutiae for keeping out mosquitoes to be attended to.

7. In every endemic area there should be a special antimalarial authority, whose duties should be not merely to give advice, but to direct and carry out all anti-malarial measures even down to making sure, by examination of urine, that the ration of quinine is actually being taken.

A. A.

BULLETIN DE LA SOCIÉTÉ DE PATHOLOGIE EXOTIQUE. 1918. June. Vol. 11. No. 6. pp. 456-469. With 3 maps.—**Travaux et résultats de la mission antipaludique à l'armée d'Orient.**

A resumé of the operations of the anti-malarial commission of the French Army of Macedonia.

The occupied territory was divided into sections, each of which was in charge of one or more medical officers. Endemic indices were determined by spleen examination of natives of 15 years and under.

After survey, marshes were drained by filling in with stones and debris covered with levelled earth, and by deep soak-pits. Vegetation was cleared continuously. Stagnating water-courses were canalised, and the double-canal method of SERGEANT [see this *Bulletin*, Vol. 8, p. 42] was kept in mind. Ground near camps and cantonments was put under appropriate cultivation. Certain waters were treated with petroleum periodically: when ordinary petroleum was used 15 cc. to the square metre was the quantity applied.

In the neighbourhood of dwellings drains were carefully attended to, waste water was led into soak-pits, and water for domestic use was protected by wire-gauze. Doors, windows, fan-lights, flues, and openings of every sort were screened with wire gauze. In native huts a ceiling of sack-cloth was stretched underneath the thatch. In the hospitals mosquito-nets were supplied to every bed. Mosquitoes were regularly killed and trapped. Where, in spite of all precautions, mosquitoes were found to enter, fumigation with cresyl was adopted: fumigation would be carried out for 2 hours once or twice a week.

For troops in billets mosquito-tents were used. For troops in the line mosquito-veils were prescribed. Gauntlets can be used by army service men and sentries behind the line, but not by men who have to fight; these last should be supplied with anti-mosquito pomade.

It is laid down that quinine should be used preventively in a daily dose of 40 cgm. (60 cgm. in highly malarious tracts).

A. A.

BUSSIÈRE (Fr.). Paludisme et drainage. Travaux exécutés dans la région d'Eksissu, Macédoine occidentale.—*Bull. Soc. Path. Exot.* 1918. June. Vol. 11. No. 6. pp. 517-530. With 12 figs.

Ekshisu in western Macedonia seems to be one of those boggy and marshy tracts so often found in broken hill country. It is described by the author as a region of hills, little streams bursting into torrents after rain, and lakes often of marshy character. The present paper deals mainly with a great marsh along what should be the outflow of Lake Rudnik. A chart is given showing that the villages immediately surrounding the lake and marsh, as well as those to a considerable distance to the lee side of the prevailing winds, have a high malaria-index.

Among efforts to improve the sanitary conditions of these villages, which were used as billets for troops, the author mentions all the classical antimalarial methods—determination of endemic index, destruction of breeding-places of Anopheles by filling-in, clearing and burning of bush, extempore drainage, oiling, etc. and prophylactic quinine; but he describes in detail the carrying out of measures of a more ambitious and more permanent kind.

By enlisting volunteers from the villages the stagnating meandering loops of streams were drained by straight cuts or chords: and where for various reasons the dead reaches or mortlakes left by this channelling process could not be drained they were converted into deep soak-pits. Mere clearing of ground and cleaning out of old channels was found to be not much use, since marsh growth springs up again so quickly.

The author further describes the first stages of a more comprehensive undertaking, the aim of which is to alleviate the sanitary condition of the whole district by draining the great Rudnik marsh. So far the marsh has been reduced to low-water mark by correcting distant outfalls, this having necessitated the cutting of a canal 1,700 m. long, 2 m. broad at bottom and 5 to 4 m. broad at surface, and $1\frac{1}{2}$ to 4 m. deep. The next step is to complete the drainage of the entire marsh by canalisation; this will result in the reclamation of about 250,000 acres of fertile land.

A. A.

MARTIN (L.). *Aperçu technique sur les Travaux antilarvaires à exécuter sur le terrain.*—*Bull. Soc. Path. Exot.* 1918. June. Vol. 11. No 6. pp. 503–516. With 15 figs.

The various methods of controlling and suppressing the breeding grounds of mosquitoes are reviewed from a technical standpoint.

A. A.

SPARKS (J. E.), DERIVAUX (R. C.) & TAYLOR (H. A.). *Malaria Control. Results obtained by a Local Community following Antimosquito Demonstration Studies by the United States Public Health Service in Cooperation with the International Health Board.*—*Public Health Rep.* 1918. July 12. Vol. 33. No. 28. pp. 1154–1159. With 2 charts.

A short account of the anti-Anopheles measures continued in 1917, after initiation in 1916, in a lumber community of 2,029 souls in Arkansas. The measures consisted chiefly in clearing, draining, and filling operations, supplemented by oiling. The reduction in malarial fevers for the two years, as determined by professional visits, was 92 per cent. The total cost of the operations was, for 1916 \$2,506.4 (= \$1.23½ per capita), and for 1917 \$1,275.45 (= \$0.63 per capita). From the industrial standpoint the money thus spent is regarded as a magnificent investment.

A. A.

ROGERS (Leonard). *Quinine Prophylaxis in Malaria.*—*Indian Med. Gaz.* 1918. July. Vol. 53. No. 7. pp. 249–252.

In this well-reasoned review of a controversial subject the author dwells on the prevalent ambiguous usage of the term “quinine prophylaxis,” pointing out that in places having a very high endemic index, where the indigenous population may be assumed to be generally infected already, there can be no opportunity for preventing infection by drugs, the only scope for true prophylactic treatment in such places being among presumably sound immigrants.

The author considers that in places where the great majority of the population is already infected, and quinine prophylaxis has no applicability, full curative treatment with quinine, preferably once a quarter, is necessary for the abatement of malaria.

As regards true quinine prophylaxis the author is of opinion that the frequently reported failure of Koch’s method—10 to 15 grains on two

consecutive days every week may be due to the interval between doses being too long for some forms of malaria, particularly virulent subtertian; and that failure with a daily 5-grain dose may be due to insufficiency of the dose.

The author lays down the following principles of rational quinine-prophylaxis:—(a) the dose should be sufficient to kill all invading parasites, leaving no intractable resisting forms; (b) the intervals between doses should not exceed a term two days' less than the mean incubation period of the most rapidly developing form of malaria present; (c) the dose should be given on two consecutive days to catch each brood of a possible double infection.

The practical observance of these principles is thus formulated:—To be effective as a prophylactic (using the term in the sense restricted as above) quinine is to be given in not less than 10-grain doses on two consecutive days, at intervals of not more than four days; or in highly malarious places the dose should be increased to 15 grains and the interval reduced to two days.

A. A.

PRINGLE (K. D.). **Quinine in Malaria Prophylaxis.**—*Indian Med. Gaz.* 1918. July. Vol. 53. No. 7. pp. 258–260.

The author's experience is drawn chiefly from a population of about 12,000 tea-garden coolies, most of whom are immigrants from various parts of the Bengal Presidency. About half of the children who arrive with their parents have an enlarged spleen, as have about 85 per cent. of the children born locally. Clinically most of the malaria is benign tertian, but sub-tertian is common, and quartan sometimes occurs. Quinine is given, under native superintendence, usually in five-grain doses thrice a week on alternate days for 8 months, but there is some divergence in practice in different tea-gardens, some irregularity due to occasional shortage, and no exact records of individual consumption are kept. Obviously the data for conclusions are here somewhat vague.

In one particularly malarious garden, however, the coolies, living under identical conditions, were divided into two batches, in one of which (consisting of 218 individuals) the average weekly consumption of quinine per head was 15 grains, and in the other (consisting of 472 individuals) 5 grains: in the first batch the percentage of malarial fevers was 8, in the other batch 28.

A considerable number of Europeans in the district take quinine daily; and among them attacks of fever are slight and usually follow a lapse of their quinine habit.

The author therefore considers that quinine has a useful application in prophylaxis, and that regular takers are either free or nearly free from attack or at any rate are very amenable to treatment when infected. He recommends a 5-grain dose daily, to be increased if necessary on certain days.

A. A.

HENAO M. (Emiliano). *La Quinina Profiláctica en el Ferrocarril de Antioquia*. [Quinine-Prophylaxis on the Antioquia Railway (Colombia).]—*Rev. Clin.* Medellín. 1918. Mar. Vol. 2. No. 8. pp. 342-353. With 1 chart.

During the last $3\frac{1}{2}$ years the prophylactic use of quinine has been introduced on the Antioquia railway for all the members of the staff and their families. The quinine is distributed in a daily dose of 30 centigrammes, with the exception of Sundays. The improvement resulting is shown graphically on a chart, the principal figures being as follows :

Before distribution of quinine.

Year.	Monthly sick (average).
1912 ..	11.1 per cent. of employés.
1913 ..	6.0 " "
1914 ..	5.1 " "

After commencement of distribution.

Year.	Monthly sick (average).
1915 ..	1.5 per cent.
1916 ..	3.3 "
1917 ..	1.7 "

J. B. N.

CARTER (H. R.). *Breeding of Anopheles quadrimaculatus in Deep Water and at a Distance from Shore*.—*Public Health Rep.* 1918. Apr. 19. Vol. 33. No. 16. pp. 571-572.

In the course of malaria surveys the author has observed abundant larvae and pupae of *Anopheles quadrimaculatus* in drift flotsam formed mainly of detritus and pollen of *Vallisneria*. The stretches of flotsam were sometimes measurable in acres and lay far from shore in water ranging from $2\frac{1}{2}$ to over 6 feet deep, thus being difficult to treat.

A. A.

LEGENDTRE (Jean). *Biologie des Anophélines de Tananarive*.—*C. R. Soc. Biol.* 1918. May 11. Vol. 81. No. 9. pp. 493-495.

The commonest species of *Anopheles* in Tananarive [Madagascar] are *A. pharoensis* Theob. and *A. squamosus* Theob. The chief breeding-places are rice-fields: larvae are also found in cress-beds, yam-fields, marshes, and irrigated market gardens, but very rarely in the irrigation channels of urban gardens. Adults make their first appearance at the end of November, become abundant towards the end of December, and disappear at the beginning of the cold season in May. The author has not found adults hibernating though he has searched in houses, stables, outhouses and storehouses and also in the bush, but occasionally he has chanced upon a specimen in his room.

A. A.

FOLEY (H.). A propos de la larve d'*Anopheles Chaudoyei*.—*Bull. Soc. Path. Exot.* 1918. July. Vol. 11. No. 7. pp. 549-550.

The writer points out with reference to LANGERON's remarks on the larva of *Anopheles chaudoyei* [see this *Bulletin*, Vol. 12, pp. 65 and 66] that he, Foley, described the larva of this species and some peculiarities of its life-history some years ago. Numerous references are here given to Foley's publications on the subject.

A. A.

BLANCHARD (Camille). Sur un nouveau type larvaire du groupe des Anophélines. Avec note additionnelle de R. Blanchard.—*Bull. Soc. Path. Exot.* 1918. July. Vol. 11. No. 7. pp. 669-677. With 2 figs.

A description in great detail of a new-hatched larva of some species of *Anopheles*. Some of the supposed peculiarities of the larva, such as the simple clypeal hairs and the simple scales representing the cockades (so-called "palmate hairs") of the later stages, have been shown by A. T. STANTON to be common features of the new-hatched larvae of many species of *Anopheles*.

A. A.

- i. MARTIN (Collier F.). Report of a Case of Idiosyncrasy to Quinine and Urea Hydrochloride.—*Interstate Med. J.* 1918. May. Vol. 25. No. 5. pp. 378-379.
- ii. KERSTEN (H. E.). Zur Chininidiosynkrasie.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1918. May. Vol. 22. No. 9. pp. 149-152. With 1 chart.
- iii. REGENDANZ (P.). Ueber Erkrankungen nach Chinin. [Pathological Effects of Quinine.]—*Ibid.* 1917. Sept. Vol. 21. No. 18. pp. 306-311.

i. The author injected into a small haemorrhoid of a young lady 3/4 minims of a 10 per cent. solution of quinine and urea hydrochloride. There followed, collapse with shortness of breath and swelling of feet and hands, so severe that the gloves had to be cut off, and an urticarial rash from head to feet. The symptoms subsided in 2 days. This was the third similar experience of this patient, the dose each time being very small.

ii. A Lieutenant aged 36 who had never been in the tropics and had a good personal and family history went to Mesopotamia where he took quinine for an attack of fever. He promptly got bleeding from the nose and gums, red spots on the skin and nausea. The liminal dose was 0.4 gm.; 0.6 produced the symptoms mentioned. Later in hospital, when 0.6 gm. had been received in three doses there appeared nausea, vomiting great exhaustion and weakness of voice; he was somewhat dazed, heart sounds very weak, face very pale; later, petechiae over the whole body, haemorrhage from the nose and gums. He was eventually invalidated home. It is assumed that the quinine had an injurious influence on the walls of the small blood vessels and the author suggests that haemorrhage in and under the lining membranes of the internal organs, as the endocardium and pia mater, would explain the general symptoms.

iii. The observations here recorded were made in the course of administration of prophylactic quinine to a considerable number of troops; how many and where is not stated. The dose was 0.3 gm. daily and, at first, 0.9 gm. once a week. After two months the bigger dose was dropped out and no more untoward symptoms were seen. The symptoms, observed in 0.2 per cent. of the takers, were fever, a rash, and oedematous swellings. The rash took the form of urticaria, of scarlet

fever, measles, or erysipelas and in half the cases was attended with pruritus. In a few cases petechiae were seen. The skin eruption left in some cases brown pigmentation. The oedema occurred chiefly on the face, about the pinnae and eyelids, and produced much disfigurement; the hands and feet also were affected. Fever was a feature in every case but one, a sudden rise reaching on an average 39° C.

A. G. B.

- i. WATSON (Standish J.). Precautions against the Spread of Malaria. [Correspondence.]—*Brit. Med. Jl.* 1918. June 29. pp. 736-737.
- ii. TRIBONDEAU (L.). Les principaux aspects de l'hématozoaire du paludisme.—*Arch. Méd. et Pharm. Nav.* 1918. June. Vol. 105. No. 6. pp. 466-468. With 3 figs.
- iii. LAWSON (Mary R.). Aestivo-Autumnal Parasites. Multiple Infection of Red Corpuscles and the Various Hypotheses concerning it.—*Jl. Experim. Méd.* 1918. June 1. Vol. 27. No. 6. pp. 749-761. With 4 plates.
- iv. VENNIKER (J. C.). A Short Address on the Subject of Malaria.—*S. African Med. Rec.* 1918. May 11. Vol. 16. No. 9. pp. 132-136.
- v. HUBAN (John P.). Tartar Emetic in Treatment of Malaria. [Correspondence.]—*Lancet.* 1918. May 25. p. 750.
- vi. ROBINSON (Beverley). Timely Remarks about the Treatment of Malaria.—*Med. Record.* 1918. May 18. Vol. 93. No. 20. (Whole No. 2480.) p. 852.
- vii. WRIGHT (W. F.). Malaria Fever. Its Treatment and Complications.—*Dublin Jl. Med. Sci.* 1918. May. 3 Ser. No. 557. pp. 288-294.
- viii. YEATES (Edward). Quinine in Malaria. [Correspondence.]—*Brit. Med. Jl.* 1918. May 25. pp. 603-604.

i. The title is misleading: the author merely comments on the manner of giving quinine, and on possible errors of diagnosis.

ii. Some rather crude uncoloured figures, with explanations, of the three species of *Plasmodium* affecting man.

iii. This paper does not contain anything novel.

iv. Contains nothing new.

v. The writer criticises the technique and the conclusions of FALCONER and ANDERSON [see this *Bulletin*, Vol. 11, p. 301] in respect of the tartar emetic treatment of malaria.

vi. The author regrets that Warburg's Tincture and tincture of bark are not more frequently used, particularly in chronic malaria and in cases where quinine is inefficient.

vii. Starting with the proposition that "at the beginning of the East African campaign comparatively little was known about malaria and its treatment" the author describes the methods of treatment with quinine and arsenic adopted by him.

viii. The author avows his belief in quinine for prophylaxis no less than for treatment in malaria, provided that the drug be taken in solution and that the state of the bowels be looked to.

A. A.

- i. ENGEL (C. S.). Beitrag zum Verhalten der Parasiten und der Blutzellen bei Malaria. [The Behaviour of the Parasites and Blood Cells in Malaria.]—*Cent. f. Bakt. I. Abt. Orig.* 1918. Aug. 22. Vol. 81. No. 7. pp. 558-565.
- ii. HESSE (Walter). Malaria comatosa und Malariameningitis bei Tertiana-fieber.—*Zentralbl. f. Innere Med.* 1918. June 22. Vol. 39. No. 25. pp. 385-394. With 1 chart.
- iii. STACH (Z.). Neue Methode zur Färbung der Malariaparasiten. [New Methods for staining Malaria Parasites.]—*Cent. f. Bakt. I. Abt. Orig.* 1918. July 31. Vol. 81. No. 6. pp. 476-477.

- iv. BILKE. Ueber abnorm lange Inkubation bei Malaria. [Unusually Long Incubation in Malaria.]—*Munch. Med. Woch.* 1918. July 16. Vol. 65. No. 29. pp. 787-788.
- v. MUELLER (Eduard). Malariafragen.—*Zentralbl. f. Innere Med.* 1918. Apr. 27. Vol. 39. No. 17. pp. 257-262.
- vi. HANNEMANN (Karl). Ueber Skorbut, Chininanaphylaxie und Malaria. Studien zur Frage der Arzneimittel-Idiosynkrasien. [Scurvy, Quinine Anaphylaxis and Malaria. Studies on Drug Idiosyncrasies.]—*Munch. Med. Woch.* 1918. June 18. Vol. 65. No. 25. pp. 665-669.
- vii. GALLI-VALERIO (B.). Sechzehn Jahre Untersuchungen über Kuliziden und Malaria. [Sixteen Years' Investigations of Culicidae and Malaria.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1918. May. Vol. 22. No. 9. pp. 154-158.

i. Beyond the statement that the tertian parasite may show characters that are typical for the subtertian—a statement which surely must be meant to refer only to the non-sexual forms—this paper contains nothing very original.

ii. The author describes two fatal cases of "benign" tertian, one of the acute cerebral type culminating on the fourth day with delirium, the other running its course as a chronic relapsing meningitis.

iii. The stain is made up of Thionin, Methylene Blue and Eosin. Absolute alcohol is not needed, nor distilled water. The results are said to be good.

iv. Three cases are described in which attacks of malaria occurred for the first time, as far as could be ascertained, 6½ months after the patient had left a malarial region. The relapse in each case—so it is regarded by the author—occurred between February and May.

v. A lecture in which the author treats of prevention, mixed infections, quinine resistance and evidence of cure. Nothing original.

vi. Apropos of numerous cases of scurvy occurring in Rumania and Macedonia where malaria is endemic and quinine prophylaxis is general the author suggests that the haemorrhages may be due to malaria or to quinine and that the differential diagnosis is often difficult. He believes that the scurvy like manifestations following the taking of quinine are caused by its derivatives which arise in the body, whose action is partly local and partly central. The paper is involved and the meaning is often obscure.

vii. Since 1901 the author has published every year articles on his investigations of mosquitoes, especially in Switzerland and North Italy. He here gives a short account of these with a complete list of references, 45 in all.

A. G. B.

MOLINARI (G.). Diagnosi e terapia dei tipi di malaria nei Balcani. [Diagnosis and Treatment of the Types of Malarial Fever met with in the Balkans.]—*Riforma Med.* 1917. Dec. 8. Vol. 33. No. 49. pp. 1145-1148.

The author discusses the diagnosis and treatment of malaria from experience in the Balkans, but does not suggest anything novel.

J. B. N.

BLACKWATER FEVER.

- ARKWRIGHT (Joseph A.) & LEPPER (Elizabeth H.). i. **A Series of Sixteen Cases of Blackwater Fever occurring in the Eastern Mediterranean.**—*Trans. Soc. Trop. Med. & Hyg.* 1918. Feb. Vol. 11. No. 4. pp. 127–148. With 7 charts.
- & —. ii. **Notes on Sixteen Cases of Blackwater Fever occurring in Malta.**—*Jl. Roy. Army Med. Corps.* 1918. Apr. Vol. 30. No. 4. pp. 378–394.

These two papers deal with the same matter. Details concerning the history of the patient before the attacks, the nature of the malarial infection, the principal symptoms and the facts relating to quinine treatment are given in tables.

The onset of the attack was as a rule sudden, fever, shivering, and vomiting preceding by one to three hours the haemoglobinuria. In three cases *Plasmodium falciparum* were found in the blood a few hours before the attack; in three cases *P. falciparum*, and in one case *P. vivax*, were found a few days before the attack; and in one case crescents were found two days before the onset of blackwater. Of the 11 cases in which malaria was diagnosed microscopically *P. falciparum* was found in nine and *P. vivax* in two.

Although jaundice, of different degrees of intensity, was observed in all the cases, bile pigment was found in the urine only of one case, but the haemoglobin may have prevented the detection of small amounts of bile pigment by the ordinary tests (HNO_3 and iodine). Bile pigment was detected during life in the serum of four cases.

Methaemoglobin or acid haematin was present in the urine of most cases in addition to oxyhaemoglobin. The spectra of methaemoglobin and acid haematin are very much alike and unless these pigments are present in fair concentration the band in the red, which is the most characteristic part of these spectra, is not seen. Oxyhaemoglobin is, in part at least, rapidly converted into haematin in acid urine. In two dark brown specimens of urine from one case no spectra of haemoglobin, methaemoglobin or acid haematin could be seen although the urine contained much albumen. That the colour was due to altered blood pigment (probably chiefly acid haematin) was shown by the appearance of a reddish purple colour due to the formation of haemochromogen, after the addition of strong caustic soda solution. The duration of haemoglobinuria varied from 12 hours to 5 days, average 2·9 days.

In 4 of ten cases examined the blood serum was sufficiently coloured with haemoglobin to give a spectrum in a tube ·3 to ·4 cm. in diameter. Of the other six, in which haemoglobinaemia was not found, the blood was examined only a few hours before haemoglobinuria ceased in 3 cases, in one case during an intermission of haemoglobinuria, in one case after it had ceased and in the last case, which had a mild attack, the serum was examined a few hours after the onset of the attack.

Regarding treatment the authors write as follows:—

“Every case received one or more doses of quinine daily during the haemoglobinuria. This was given in the form of the bihydrochloride usually in doses of ten to fifteen grains, and, as a rule, intramuscularly,

but when intravenous saline injections were given the dose was added to the saline in most cases. Some cases received fifteen grains daily for a week or longer, others were given doses of ten to fifteen grains at irregular intervals. When the tendency to vomiting had ceased, quinine hydrochlor. or quinine sulphate was given by the mouth. In two or three cases the temperature chart suggested that the quinine had some effect in reducing the fever. There was no evidence that the quinine increased or caused a relapse of the haemoglobinuria. Saline injections were given regularly every four or six hours by the rectum in almost all cases. In the more severe cases, especially when the enemata were not retained, one or more intravenous saline injections of one to three pints was given with decided benefit. Other treatment consisted of a single dose of calomel (two grains) to several of the patients. Subcutaneous injections of digitalin, pituitrin, strychnine, and in Case 4 ten cubic centimetres of normal horse serum were given subcutaneously the day before the haemoglobinuria ceased."

The post mortem changes found in the three fatal cases agree with those described by BARRATT and YORKE. In all three cases the contents of the gall bladder presented a remarkable appearance. The gall-bladder was full of dark green, almost black bile of the consistency of thick porridge. It was almost solid and after incision of the sac was turned out in a solid mass.

The authors describe a method (a modification of Sahli's) of estimating the degree of haemoglobinuria, direct estimation of the amount of blood pigment in the urine being unsatisfactory because the kind of pigment is not always the same and there is often a mixture of pigments; moreover some of the blood pigment is not in solution, but is found in the deposits.

"Since blackwater fever urine probably never contains more than twenty-five per cent. of the amount of the haemoglobin in normal blood (the highest figure which we obtained was 12.5 per cent.) tubes about 1.5 cubic millimetres in diameter, i.e., twice that of ordinary haemoglobinometer tubes, were used, and a standard solution of acid haematin was made with 0.5 per cent. instead of one per cent. of normal blood.

"Several tubes of equal diameter were selected and calibrated with mercury at 1, 2, 5 and 10 cubic centimetres. The colour standard was prepared by taking 0.05 cubic centimetre of normal blood and making it up to 10 cubic centimetres with N/10 HCl saturated with chloroform as a preservative.

"A wooden stand carrying a graduated scale as shown in the diagram was made and the scale so arranged that the 100 mark corresponded to the 10 cubic centimetre line on the tube, the 10 mark with the 1 cubic centimetre line, etc.

"To make an estimation, 0.5 cubic centimetre of urine was placed in one of the tubes and 0.2 cubic centimetre of N/1 HCl added. The contents were well mixed and allowed to stand for a minute in order that the solution might become clear. Dilution was then carried out with water till the colour matched the standard. To obtain the percentage of haemoglobin in terms of blood the number read off the scale must be divided by ten, since the amount of urine used is ten times that of the blood used in making the standard. Thus a reading of fifty means that the urine contains blood pigment equal to that in a five per cent. solution of blood. (This we have called five per cent. haemoglobin.) If the percentage of haemoglobin is small, less than two per cent., 1 cubic centimetre of urine should be taken for the test instead of 0.5 cubic centimetre and the reading divided by twenty."

The slight degree of error in the estimation may arise if the urine contains much additional abnormal pigment (urobilin, urochrome and bile pigment).

The conclusions are :

- "1. Blackwater fever is due to malaria.
- "2. It is predisposed to by a long standing malaria infection with repeated relapses.
- "3. An attack of blackwater fever is precipitated by a relapse or recurrence of malaria.
- "4. The ascertained *maximum* and *minimum* intervals in different cases in our series between the arrival in a malarial country and the first attack of blackwater fever were *maximum* ten years, *minimum* seven months; between the first recognised attack of malaria and the first attack of blackwater fever were *maximum* ten years, *minimum* fifty days; between the arrival in a country which was non-malarial and free from *Anopheles* and the first attack of blackwater fever were *maximum* five months, *minimum* one month.
- "5. Quinine in the class of cases with which we have met has no share in producing blackwater fever, nor has quinine treatment during or after the attack any effect in prolonging or reproducing haemoglobinuria.
- "6. The jaundice of blackwater fever is certainly in some cases due to bile-pigment in the circulation.
- "7. It is possible to estimate the total amount of blood-pigment in the urine, whether in solution or in the deposit, after converting it into acid haematin (modified Sahli's method). The amount of haemoglobin lost by the kidneys is much greater than would be ascertained by an attempt at direct haemoglobin estimation of the urine. We are convinced, however, that the kidneys excrete only part, possibly a small part, of the haemoglobin which is lost in an attack of blackwater fever.
- "8. The treatment which appeared to be of most value was intravenous or rectal administration of physiological salt solution (Na Cl 0.9 per cent.). Whether quinine is of value or not was difficult to decide, since all our cases had some quinine and the intensity of the attack was no doubt different in each case."

W. Yorke.

SEYFARTH (Carly). *Schwarzwasserfieber in Südostbulgarien*. [Blackwater Fever in South East Bulgaria.] *Arch. f. Schiffs- u. Trop. Hyg.* 1918. Apr. Vol. 22. No. 7-8. pp. 128-145. With 7 charts.

Clinical details are given of 10 cases of blackwater fever—8 Bulgarians, 2 Russians, and 1 Turk. Blackwater fever was only encountered in people who had spent some considerable time in malarial regions, generally 2 to 3 years. All had had many attacks of malaria. Quinine was the chief factor which precipitated the attack; other causes provoking attacks were, however, exposure to cold or heat, over exertion or getting wet through. For example, Case 1 who had had no quinine, or other drug, developed blackwater fever after a fatiguing march, Case 10 became suddenly ill after heavy digging, and Case 2 after arduous manoeuvres. Of the 9 patients in whom parasites were found eight had *P. falciparum* and one *P. vivax*.

W. Y.

DEUTSCH (Felix). *Schwarzwasserfieber nach Röntgenbestrahlung der Milz bei einem Fall von Malaria tropica. Ein Beitrag zur Frage der Entstehung des Schwarzwasserfiebers*. [Blackwater Fever after Application of Röntgen Rays over the Spleen in a Case of Tropical Malaria. Contribution to the Question of the Origin of Blackwater Fever.] *Wien. Klin. Woch.* 1917. July 19. Vol. 30. No. 29. pp. 907-909.

The patient was infected with tropical malaria in Albania on 28 August 1916. The attacks recurred, in spite of vigorous quinine

treatment, at irregular intervals—sometimes daily, sometimes after periods of 7 to 14 days. On 23 December 1916 quinine was given for the last time and on 3 Jan. 1917 he came under the author's observation. The last paroxysm of fever was on 29 December 1916.

On admission examination of the blood gave the following figures. Red corpuscles 4,284,000; leucocytes 4,650; Haemoglobin 53 per cent. A differential leucocyte count was as follows: Polynuclear 42 per cent., Mononuclear 7 per cent., lymphocytes 42 per cent., transitional cells 6 per cent., and eosinophils 4 per cent. In numerous blood films and in films of spleen pulp only a few malaria parasites were found. The spleen extended two fingers' breadth below the costal margin but the liver was not palpable; the urine contained urobilin but neither albumen nor sugar. From 7 to 16 Jan. the spleen was subjected to the action of Röntgen rays on six occasions.

On the evening of 17 January after a mild rigor of short duration the patient observed that his urine was black. The following morning the skin and sclerotics were pale and icteric, and the patient felt very sick and complained of dizziness, weakness and slight difficulty in breathing. There was a high degree of engorgement of the liver, pressure under the costal margin being painful. The spleen dulness was much less than it was three weeks previously and the organ scarcely palpable. The urine which was dark red was passed in normal quantity (1400-1600 c.c.). It contained bile pigment, urobilin, a few leucocytes, no red cells, and granular casts. In the blood the number of red cells had fallen to 2,400,000 and the haemoglobin to 34 per cent. A differential leucocyte count gave the following result: Polynuclears 61 per cent., mononuclears 13 per cent., lymphocytes 15 per cent., transitional cells 7 per cent., eosinophils 5 per cent., and 1 Türks giant cell. No autolysin or isolysin was demonstrable in the serum about 20 hours after the onset; coagulation of the blood was extremely slow. The Donath-Landsteiner reaction was negative.

A direct action of the malaria parasites could hardly have caused the blackwater fever as not only in the blood but also in spleen puncture the parasites were present in such small numbers. The resistance of the erythrocytes to hypo- and hypertonic saline was examined but found not to differ appreciably from that of normal blood. The question arises, in what manner do the rays influence the spleen function or the blood so that haemolysis or more properly haemoglobi-nuria occurs? In order to answer this question allusion must be made to the problem of the relationship of the spleen function to the formation and destruction of erythrocytes. It must be remembered that the function of the spleen depends upon two factors, firstly the activity of the organ and secondly the character of the erythrocytes. Up to the present only the capacity of the spleen to destroy red cells and haemoglobin through phagocytosis is actually known, but nothing of its haemolytic capacity. It has not yet been found possible to extract a haemolysin from the spleen, but nevertheless in certain pathological conditions an extra-cellular destruction of erythrocytes must occur, as in those diseases in which a greatly increased destruction of blood occurs in the spleen no corresponding increase of phagocytosis of red cells is seen. It is possible that some such autolytic process had occurred in the case under discussion. Whether

the haemolysis is dependent upon the formation of a hormone which is set free by the spleen into the circulation is unknown.

It was conceivable that the erythrocytes themselves were directly damaged by the action of the rays and thus prepared for haemolysis. This however is not the case in normal persons; the erythrocytes themselves are very resistant to the action of Röntgen rays. The red cells of the patient in question were just as resistant to the action of Röntgen rays as those of normal blood. It follows therefore that the onset of blackwater fever in this case was caused by a disturbance in the functioning of the spleen provoked by Röntgen rays and consequently a derangement in the action of those organs closely associated with the spleen.

It is known that the disposition to blackwater fever can disappear, become less, or persist unaltered, after an attack; hence it is of interest to follow the subsequent history of the patient. About 8 days after the commencement of the attack the patient had completely recovered and was free from fever. He was then put on a quinine cure which was tolerated well. For two months no parasites were found in the blood and convalescence continued undisturbed. Then there was relapse and tertian parasites were found in the blood although they had not been discovered previously. An injection of neosalvarsan .9 gm. was given but had no action. Röntgen rays were then again applied to the spleen as previously. The attacks were if anything increased in intensity, the anaemia rapidly increased, the erythrocytes commenced to fall rapidly in number, the urobilinuria increased distinctly, and slight icterus appeared. The patient felt weak and in fact an attack of blackwater fever appeared inevitable. As however this did not occur, four days afterwards the patient was again put on quinine and his condition improved rapidly.

W. Y.

WRIGHT (E. T.). **A Case of Blackwater Fever with Prowazekia in the Urine.** *Jl. Trop. Med. & Hyg.* 1918. June 1. Vol. 21. No. 11. pp. 113-114. With 12 text-figs.

Clinical details of a case of blackwater fever are given. Towards the end of the attack a flagellate was found in large numbers in the deposit obtained by centrifuging the urine. The author is of opinion that the parasite was not *Prowazekia urinaria*, but that it resembled *P. asiatica* more closely, and possibly was this species

W. Y.

GARIN (Ch.), GIRARD & SARROUY. **Contribution à l'étude de la fièvre bilieuse hémoglobininurique au cours du paludisme.**—*Jl. de Physiol. et de Path. Gén.* 1917. Vol. 17. No. 3. pp. 484-489. With 1 chart.

The authors recall that MANSON in his text book, after having considered the malarial and quinine theories of blackwater fever, expresses the view that it is a specific disease due to an unknown parasite.

It is however much more probable that this affection is a syndrome which can result from very diverse causes; in any case it is certain

that the syndrome is fairly frequently observed in the course of secondary malaria of Macedonian origin. Although icterus is very frequent in malaria it is rarely accompanied by haemoglobinuria.

What the authors desire to record is the existence in patients who suffer from haematogenous jaundice, of modifications of the red cell resistance. Haematogenous jaundice in the case of secondary malaria is due to a constitutional fragility of the red cells and is precipitated by the absorption of quinine. It is not considered that malaria or quinine can diminish the normal resistance of the red cells but in certain subjects who exhibit a congenital diminution of red cell resistance the action of malaria augmented by quinine can produce the haematogenous jaundice syndrome. Details are given of two cases of blackwater fever. As a result of their observations on these cases the authors conclude :—

That there is an evident relationship between the appearance of haemoglobinuria and the administration of quinine, orally or subcutaneously.

That it is manifest that the red cell resistance of the two patients was diminished before they contracted malaria: the first patient had always been more or less yellow and his father exhibited the same colouration, whilst the second had had purpuric spots on many occasion before being infected with malaria.

W. Y.

- i. MATKO (J.). Ueber Wechselbeziehungen zwischen Harn und Chinin in der Hämolyse. [The Interrelationship between Quinine and Urine in Haemolysis.] —*Wien. Klin. Woch.* 1918. Jan. 17 & 31 & Feb. 14. Vol. 31. Nos. 3, 5 & 7. pp. 65-70; 130-131; 188.
- ii. FREUND (Ernst). Ueber Wechselbeziehungen zwischen Chinin und Harn in der Hämolyse. Diskussionsbemerkung zum Vortrage Dr. Matko. *Ibid.* Jan. 31. No. 5. pp. 131-132.
- iii. STEJSKAL. Ueber Wechselbeziehungen zwischen Chinin und Harn in der Hämolyse. II. Mitteilung. Beitrag zur Therapie des Schwarzwasserfiebers. *Ibid.* Feb. 14. No. 7. p. 188.

A solution of quinine bisulphate (.4 per cent.) in physiological saline exerts a strong haemolytic action capable of laking .5 per cent suspension of red cells in about 15 minutes at 37° C.; in certain cases the red cells are especially sensitive to this haemolytic solution and are found to have lost their haemoglobin within 5 minutes.

By mixing 10 cc. of urine with .2 cc. of a 20 per cent solution of quinine bisulphate a .4 per cent. solution of quinine in urine was prepared and its action on red cells was tested. In order to investigate the effect of the urine on the action of the quinine 10 healthy and 15 malaria cases were chosen; from these the urine was collected thrice daily (at 6 a.m., 10 a.m. and 4 p.m.) over a period of ten days. The procedure adopted was to fill the red cell pipette of a Thoma Zeiss counting apparatus with freshly drawn blood up to the mark 0.5 and then to draw in the solution (quinine in saline or quinine in urine) to be examined up to the mark 101. After shaking thoroughly the mixture was put in the incubator at 37° C. Experiments shewed that, with the exception of a chronic malaria case, the urine of all the cases possessed from time to time the capacity of inhibiting, completely

or partially, the haemolytic action of the quinine. This inhibitory action was found in about 10 (30 per cent.) of the 30 specimens of urine examined from each case; in the remaining urines (70 per cent.) the haemolytic action of the quinine was evinced.

Further experiments on this inhibitory action of urine showed that alkalies can to a certain extent limit the haemolytic action of quinine, but for the complete prevention of haemolysis by urine a second factor (at present unknown) must be present. This is further shown by the fact that it is impossible by the addition of alkalies to any urine to make it completely protective against quinine haemolysis, and furthermore the protective action is sometimes absent in urines of slight acidity and present in urine of high acidity. What the nature of the unknown body is remains for further work to decide; neither boiling nor shaking up with ether or chloroform deprives the urine of this property, and therefore it is probably associated with the salts in the urine.

A further series of experiments were undertaken to ascertain the behaviour on red cells of the urine alone, without the addition of quinine, collected from patients during the administration of Nocht's quinine cure. As before urine was collected thrice daily (at 6 a.m., 10 a.m. and 4 p.m.) during a period of 10 days from 10 healthy persons and 15 malaria cases. whilst taking the Nocht treatment, i.e., quinine bihydrochloride .2 gm. five times daily at two hourly intervals. The results showed that in 20 of the cases (12 malaria and 8 healthy) the urine from time to time exhibited a more or less strongly haemolytic action. In 10 of the cases the toxic action of the urine was observed four hours, and in one specially investigated case 2 hours, after the commencement of the quinine cure. This phenomenon must be considered in connection with the onset of blackwater fever as it is customary for this condition to follow quinine administration within about 2 to 4 hours. The intensity and duration of the production of the reaction depends on the individual case: in only one of the 25 cases was haemotoxic urine secreted during the whole quinine course.

The process of destruction of erythrocytes by these urines is in all respects similar to that observed by the quinine in the presence of partially, but not completely, protecting urine as described above. In both cases destruction of only a certain proportion of the erythrocytes takes place. Experiments with erythrocytes of various individuals and the same toxic urines show that the cause of the destruction of the red cells is to be sought in the urine and not in the corpuscles for in all these comparative experiments with different erythrocytes more or less similar results are obtained.

In his second paper Matko states that the protective power of urine against a haemolytic action of quinine depends upon its content of acid phosphates (K_2HPO_4 or Na_2HPO_4) which also exert *in vitro* a protective action. In order to prevent haemolysis *in vitro* by .04 gm. of bisulphate of quinine .007825 gm. of di-sodium phosphates, free from water of crystallisation, is necessary—the optimum amount is about .015 gm. As a result of these observations the author surmised that the onset of blackwater fever is bound up with a disturbance of phosphate metabolism, and decided to treat a case of this disease with di-sodium phosphates. He injected intravenously

a 24 year old man, 16 hours after the onset of blackwater, with 200 cc. of a 2·5 per cent. solution of di-sodium phosphate; seven hours later (6 p.m.) the urine was almost normal. One hour afterwards (7 p.m.) however there was a severe relapse; at 10 p.m. 200 c.c. of the solution was again injected, and 8 hours later (6 a.m.) the urine was again practically normal. Again at 7 a.m. a severe relapse occurred and it was then decided to combine the di-sodium phosphate with sodium chloride, and at noon 120 cc. of a 6 per cent. solution (containing both salts in equal proportion) was injected. The result was astonishing, the haemolysis ceasing immediately. The urine became clear one hour after the injection and in 4 hours the haemoglobinuria had completely disappeared.

The injection of di-sodium phosphate is followed constantly after about half an hour by a rigor and rise of temperature to from 39° C. to 40·5° C.; by combining the di-sodium phosphates with sodium chloride the rigor and rise of temperature are avoided.

The general condition of the patient improved rapidly after the injections, which also had a remarkable effect on the blood. Before injection the red cell count was 3,000,000 and the haemoglobin 40 per cent. and blood films showed profound changes in the red cells, e.g., marked poikilocytosis, etc. Two hours after the first injection the red cells numbered 5,000,000 and the percentage of haemoglobin was 120: in blood films the red cells stained deeply and were all of normal appearance.

The author concludes that his observations on this case showed that on the one hand the injection of di-sodium phosphates resulted in the immediate disappearance of the severe blood changes, and the production of a normal red cell picture, and on the other hand that di-sodium phosphate in combination with sodium chloride brought the haemolysis to a standstill.

Freund and Stejskal took part in the discussion which followed Matko's communication.

W. Y.

ERNESTO LÓPEZ (R.). *Investigaciones sobre Patogenia y Tratamiento de la Fiebre Biliosa Hemoglobínica.* [Research on the Pathology and Treatment of Bilious Haemoglobinuric Fever.]—*Gac. Méd. de Caracas.* 1918. Feb. 15. Vol. 25. No. 3. pp. 23-24.

The author recommends the use of an antihæmolytic solution for the treatment of haemoglobinuria, when occurring in malaria. The solution is prepared as follows:—

Sodium chloride	..	..	..	20 grammes
Calcium chloride	..	..	..	8 grammes
Sterile distilled water	..	..		1,000 cc.

Of this solution 250 cc. are injected intravenously every four to six hours, followed by an intramuscular or subcutaneous injection of 10 cc. of a 40 per cent. solution of urotropine.

J. B. Nias.

BOOK REVIEWS.

CHAUDHURI (Tarini Charan) [M.A.]. *Sir William Ramsay as a Scientist and Man.* With an Introduction by PANCHANAN NEOGI [M.A., Ph.D.].—ix + 66 pp. With 1 plate. 1918. Calcutta & London: Butterworth & Co. [Price Re. 1. 8 net.]

To Professor Neogi who inspired the work and to the author who carried it to completion we can offer unstinted congratulations. Mr. Chaudhuri has compiled a useful and interesting book which, in clear and concise language, contains all that is essential of the life and work of Sir William RAMSAY. The price places it within reach of all students of chemistry to whom the biography makes a special appeal, as an example, and as a standard possible of attainment. Chemistry is still full of problems awaiting solution. It is quite unnecessary to give details of Sir William RAMSAY's achievements as here recorded. They include the discovery of the "zero group" of inert gases, "helium, argon etc.," original work connected with radium and radio-active substances and much else that is carefully described by the author. A full list of Sir William RAMSAY's contributions to the literature of chemistry will be found at the end of the volume. On page 3 we are told that Sir William's youthful interest in chemistry was due to a desire to make fireworks, a desire that has filled the heart of many a boy! With nine such the matter ends in flame and smoke; with the tenth, as in RAMSAY's case, the love of science is the root of the matter and the "fireworks" form merely a picturesque incident. One of the results of the study of radium and its derivatives has been the belief that radium D is "identical with radio-lead." Mr. Chaudhuri draws attention to this natural evolution of elements and to Sir William RAMSAY's belief in transmutation. He is careful, however, to point out that this "transmutation" is in no way parallel to that for which the Alchemists laboured. Those gentlemen, mostly prompted by desire for wealth, sought to obtain gold from baser metals, and, if their crucibles failed them they very often extracted gold from the pockets of greedy and more credulous dupes.

But apart from the scientist, the book deals with the man and displays a personality with wide accomplishments and pleasant social sympathies. Sir William RAMSAY was not a stranger to India (v. p. 31), and this little book will no doubt extend his fame and his influence.

The "Introduction," written by Mr. Neogi, professor of chemistry at the Government College, Rajshahi, shows that he has grasped the value of the "historical method of teaching" so well illustrated by books like the one now reviewed. As the history of the world is, in the main, the sum of the life-work of its greatest men whether for good or evil, so the story of any branch of science may be filled with living interest through the biographies of workers and discoverers. The dullest student will remember the origin of the atomic theory as part of DALTON's life struggles. As to the practical value of Chemistry there are now, and will be in the future, many openings for reliable chemists. Every country now welcomes all help that chemists can give either to war or to industry, and the bad times are gone for ever in which a LAVOISIER could be condemned to death with the cynical jibe: "La République n'a pas besoin de savants." The publishers have done their best to make the book attractive. It is well printed in clear type and free from type errors.

J. H. Tull Walsh.

LE MOIGNIO (E.) et SÉZARY (A.). *Nouvelle Méthode de Vaccination Antityphoïdique. Le Lipo-Vaccin TAB.* Les Actualités Médicales.—78 pp. 1918. Paris: Baillièrre et fils. [Price 2 fr.]

This small monograph, one of a series dealing with "modern medicine," contains the record of researches and the results obtained during two years, with the necessary experimental work on animals and on man.

The authors follow a logical line giving first the reasons for desiring change and improvement. The value of vaccines affording protection against the Enterica, and other infections, is admitted; but there is at present no standard type of vaccine giving the best protective immunity, with the smallest possible number of inoculations and the greatest freedom from untoward reactions, local or general. In different countries, and even in the same country, differently prepared antityphoid and anti-T.A.B. vaccines are employed, the altered bacilli being suspended in a sterile aqueous vehicle. It is hardly necessary to state that even the best and most efficient vaccines suffer from certain disadvantages. These drawbacks are fully discussed in chapter 2.

A suspension of living bacilli would, indeed does, give the highest immunity but cannot be generally used owing to its toxic nature. Toxicity can be reduced by various manipulations and methods of sterilization: by heat, ether, antiseptics separately or in combination. The higher the temperature employed the more the bacterial protoplasm is altered and the antigen-value reduced. In France the vaccines most in favour until quite lately were those sterilized at 60°-120° C.; and the power of the antigen was so much reduced that to ensure complete immunity against the typhoid and paratyphoid infections four inoculations were necessary in a period of four weeks. The procedure was unpopular and, as men were sometimes removed for military reasons, or were absent on leave, such individuals did not receive the full number of injections and were not properly protected. An illustration of this difficulty is given by the authors on page 18. Further, the repeated injections expose the individual to the same number of "negative phases," generally trivial, but varying in effect from slight local or general disturbance to more or less severe forms of "vaccine disease," or to "vaccine shock." It is perhaps more than coincidence that the worst cases of "vaccine disease" have been reported in foreign journals. Some of these cases are referred to by Doctors Moignic and Sézary. All the disadvantages of a weak antigen and a large number of inoculations are not so evident in England where more powerful T.A.B. vaccines have been introduced in two doses; but their influence was recognised in France quite early in the War. WIDAL and SALIMBENI devoted much time and work to the mitigation and possible removal of such disadvantages.

It occurred to Dr. Moignic that, since the suspension of moderately sterilized bacilli in an oily medium would reduce the rate of antigen absorption, it would be possible, by means of a "lipo-vaccine," to introduce, in one dose, sufficient antigen to secure a safe and satisfactory immunity. That sterile oil can be injected subcutaneously without discomfort or unpleasant reaction is well known. A year or so ago during a serious illness the reviewer received many injections of "Camphor oil" without any discomfort. The restraining power of oil upon absorption in the tissues is shown by an experiment which the authors carried out:—"a guinea pig is killed by subcutaneous injection of 0.35 mgr. of sulphate of strychnine in aqueous solution. It can, on the other hand, bear a dose of strychnine six times greater if dissolved in oil, in proportion of 0.5 to 1 mgr. to 1 cc. of oil. The muscular excitability is, however, seen; but the absorption of the alkaloid is so restrained that the organism has time to neutralize and eliminate it without any occurrence of poisoning."

The earliest preparation was that of Moignic and PINOY [*v. C. R. Soc. de Biol.*, 1916, Nos. 5 and 9] who suspended the sterilized bacilli in a mixture of lanoline and vaseline oil. These substances were found unsuitable and Dr. Moignic now employs a mixture of oils which is satisfactory. The preparation of the "lipo-vaccine" is described in chapter 4; technique in vaccination, clinical reactions, agglutinins and their relation to immunity in chapters 5, 6 and 7. The evidence given carefully and in detail convinces one that the T.A.B. lipo-vaccine is safe, can be given in one sufficient dose, and confers an immunity equal to that given by the best of aqueous vaccines which cannot, as yet, complete their work through one safe inoculation.

The authors suggest that oil-vaccines may be usefully employed either for protective vaccination or, in reduced strength, for treatment in several other diseases. They instance cholera, pneumonia, gonorrhoea, dysentery,

anthrax and tuberculosis. They might have added plague. If it were possible to obtain a lipo-vaccine which would protect man in tropical climates against dysentery bacilli the boon would be great. Such success seems unlikely.

The book presents, in a cheap form, a very readable and carefully argued case the importance of which is obvious. As regards the chapters which deal with the nature, variety and disadvantages of aqueous vaccines readers of the *Tropical Diseases Bulletin* will find evidence on one point or another in the volumes which have been issued since 1914.

J. H. Tull Walsh.

The NOMENCLATURE OF DISEASES Drawn up by a Joint Committee appointed by the Royal College of Physicians of London. (Subject to Decennial Revision.) Fifth Edition, being the Fourth Revision.—xxiii + 311 pp. 1918 London: H.M. Stationery Office. [Price 2s. net.]

For the home keeping practitioner the fifth edition of the official "Nomenclature of Diseases" may be, and doubtless is, a most useful and admirable guide—it is not the intention here to consider it from his angle—but to doctors resident in the various tropical dependencies of the Empire it will come with something of a shock. The reviewer has not the edition of 1908 at hand but suspects that as far as tropical medicine is concerned the new differs little from the old and that the Committee appointed by the Royal College of Physicians failed to consult any of the numerous persons in London competent to advise them on exotic diseases. Clearly the status of tropical medicine is not recognised in this august quarter, for of the 23 Sub-Committees appointed to revise the different sections of the previous issue and report to the Sub-Committee on Classification none was for Diseases of the Tropics. Consequently at quite a cursory examination errors and omissions are evident. Some of the more obvious will be here considered.

Under Diseases caused by Infection we find "Mediterranean fever, Synonym, Undulant fever." Was the Committee unaware that in 1913 a Committee appointed by the Section of Tropical Medicine and Hygiene of the XVIIIth International Congress of Medicine, London, proposed that the disease hitherto known as Malta fever should be called Undulant fever and that this name was accepted both by the Section and by the Permanent Committee of the International Congress? What is meant by "Tick fever"? Presumably not Spirochaetosis nor Relapsing Fever because these are listed separately. Does it denote Spotted Fever of the Rocky Mountains? This disease is not found under Diseases caused by Infection but occurs under *Piroplasma hominis*, "the supposed cause of 'Rocky Mountain fever' or 'Tick fever'"; it is hardly necessary to remind readers of this *Bulletin* that *Piroplasma hominis* has long been discredited. In this Section one would expect to meet with Japanese River fever (Tausugamushi disease), and Oroya fever, and it is surprising not to find here bilharziasis (or schistosomiasis) or ankylostomiasis. The parasites producing these conditions, with the notable exception of *Schistosoma mansoni* which is omitted altogether, are mentioned elsewhere but the diseases are not—unless the index is faulty—and this is not due to any objection to such a formation of a disease name, for leishmaniasis and trypanosomiasis occur. "Sand fly fever" without synonym is a vague term; surely the more precise phlebotomus fever and pappataci fever should have been given.

Under Diseases of the Female Organs of Generation, Diseases of Vulva, occurs Ulcerative granuloma, but not under Male Organs of Generation, so that we are to infer that the disease is restricted to the female sex. Pellagra is represented as an Infective Disease of the Skin and, unless the index is deficient, not under any other heading! Well-recognised diseases of the tropics for which one looks in vain are epidemic gangrenous rectitis, climatic bubo, goundou, juxta-articular nodules, ainhum, tropical sloughing phagedena, gangosa.

But it is under Animal Parasites that the most glaring errors are seen, some only of which can be indicated. This Sub-Section, which forms part of a long "Appendix" and has, one learns from the Memorandum of the Sub-Committee on Classification, been re-written for this edition, consists of a classified list of parasites with synonyms, habitat and, in some instances, with notes of the relation to disease. One would expect the terminology to accord with that of the best present-day authorities and with the generally accepted zoological rules, but neither of these does it do, so that correct nomenclature, that essential of clarity and unambiguity, receives a set-back and this in a work which is to be regarded as authoritative; for example, the name *Trichuris* is not even mentioned in association with *Trichocephalus*, nor *Acanthocheilonema* with *Filaria perstans*; and as often as not species are cited without the authors' names. *Oimex lectularius* and *Ctenocephalus canis* are stated, without any sort of qualification, to be the intermediate hosts of relapsing fever and *Leishmania infantum* respectively. Twenty-three species of *Anopheles* are bracketed as "intermediate hosts of malaria parasites" together with two species of *Simulium* and *Phlebotomus papatasi*; it is kindest to attribute this error to want of care in proof reading, but for ten years it will remain as the considered opinion of the Committee. As many of the *Anophelines* are quoted without the name of the author and are misspelt, there is often room for doubt as to their identity and the evidence for the transmissive power of such as are identifiable is of unequal validity. Was it necessary in a work on nomenclature to give information of this kind? Without some detail such a list is of little value and can hardly fail to mislead. Indeed it would be interesting to learn how some of the species came to be included.

Enough however has been said to justify the statements made at the outset and one can only hope that this official book will be revised long before 1928. It is certain that the Nomenclature of Diseases will not be "generally used by all Medical Practitioners" outside these islands "for the Registration of Diseases and the Return of Causes of Death" until it is in some sort of accord with modern knowledge. The index is full but not exhaustive.

A G. B

TROPICAL DISEASES BUREAU.

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BERIBERI AND POLYNEURITIS AVIUM.

DE MELLO (Froilano), LOUNDÓ (Ramacrisna) & REBELLO (Frederico).
Etudes sur le Béribéri humain et aviaire.—*Annales Scient. de Facul.
 de Med. do Porto.* 1917. Vol. 4. No. 1. pp. 6-72. With
 2 plates & 10 charts.

This long and carefully prepared treatise is divided into four parts. In the first a description is given of some experimental researches upon human beriberi and polyneuritis gallinarum. The results of these are in agreement with those of recent investigators and show that the ingestion of white rice produces in fowls and pigeons a definite polyneuritis, which would be best called polyneuritis avium; the bacillary theory of McCARRISON received no confirmation from these experiments. They found that Java rice, which was used at Goa for the nourishment of the Portuguese soldiers and Austrian labourers, was able to induce beriberi, and that rice bran had a therapeutic value in these cases; also that the preventive properties found in the cortical part of red rice are also present in several legumes. Some experiments on pigeons went to show that similar conditions to those seen in infantile beriberi could be produced in birds. They conclude that beriberi is an alimentary disease and not an infectious one, due to the food being deprived of certain essential substances, which substances have a therapeutic action and a preventive action; those found in legumes being able to prevent and cure cases of the disease which have originated from the use of decorticated rice and they believe human beriberi and polyneuritis avium to be identical conditions.

In the second part a resumé is given of the various epidemics recorded and the theories which have been held as to their etiology from 1891 to the present time. This part is very interesting reading and has been most carefully prepared for the use of those who have not the opportunity of reading the originals, and those who are particularly interested in the subject are specially advised to consult VEDDER's recent book on beriberi and the *Tropical Diseases Bulletin*.

The third part is a more detailed report on the epidemic of beriberi which developed on board the Austro-German ships in the port of

Mormugão, giving descriptions of the cases which, however, were not numerous. They conclude that the disease was true beriberi produced by the food, Java rice, which was used very largely and was found by experiments on pigeons to give rise to polyneuritis.

In the fourth part they quote instances found in the old Hindoo works ordering the use of legumes for the protection of health.

The whole is a powerful advocacy of the deficiency theory as an explanation of beriberi in the East, though there is very little new recorded in it.

P. W. Bassett-Smith.

VEDDER (Edward B.). Is the Neuritis-Preventing Vitamine concerned in Carbohydrate Metabolism?—*Jl. Hygiene*, 1918. Mar. Vol. 17. No. 1. pp. 1-9.

The views of BRADDON, COOPER, and FUNK [see this *Bulletin*, Vol. 5, p. 115; Vol. 4, p. 147] on the importance of the quantitative relationship of the carbohydrate intake to the amount of anti-neuritic vitamine supplied are in direct contradiction to those held by VEDDER and CLARK. The author has carried out further experiments with a large number of fowls to throw some light on the question, does an increase in the carbohydrate of the diet necessitate an increase of the vitamine-containing food as believed by the former? Is it a fact that with a sufficient amount of the vitamine, no matter how much carbohydrate is ingested, beriberi will never develop? The author points out that the experiments of BRADDON, COOPER and FUNK with hand fed birds were not reliable, and that the death of the birds was produced by over feeding and not by polyneuritis.

The experiments showed that fowls allowed to eat polished rice without restriction consumed 30-70 per cent. of their body weight, *i.e.* from 1.4 to 3.6 per cent. of their body weight daily, before the development of polyneuritis. The rapidity with which this occurred bore no relationship to the amount of rice eaten, but depended on some idiosyncrasy of the fowl.

It was seen that with a food consisting of sterilised meat or sterilised egg, fowls develop polyneuritis, but if this food is mixed with equal parts of rice the onset of the neuritis is slower, the birds being provided with a more mixed and varied diet. The author concludes that the anti-neuritic vitamine is not concerned in carbohydrate metabolism; therefore in drawing up a dietary for the prevention of beriberi, such a quantity of beans, rice polishings, barley, etc., should be ordered, as experience has shown will prevent the disease in ordinary cases, and any variations in the amount of carbohydrates given need not be considered.

P. W. B-S.

FRAGA (Clementino). Beri-Beri in Brazil.—*New Orleans Med. & Surg. Jl.* 1918. Jan. Vol. 70. No. 7. pp. 606-611.

Beriberi has very frequently been reported in an epidemic form in Brazil but often the name has been given to other diseases. In the valley of the Amazon the so-called *Galloping beriberi* which was one of the terrors of that region has been proved to be a malignant form

of malaria. Beriberi is however not uncommon in asylums and prisons and gives rise to many deaths. In Bahia there were 30 cases in 1914, 15 in 1915, and 26 in 1916. Rio Janeiro is stated to be free from the disease but in Minas it appeared in epidemic form and a few cases have occurred at San Paulo. Cases of ship beriberi were at one time very common but as the old class of vessels has disappeared the cases of beriberi have become less frequent.

P. W. B-S.

SICARD (J. A.), ROGER (H.) & RIMBAUD (L.). *Le Béribéri des Indo-Chinois à Marseille.*—*Paris Méd.* 1917. Dec. 1. Vol. 7. No. 48. pp. 459–463.

The authors, from a large experience at Marseilles, give an interesting account of the beriberi seen among the Orientals who have been imported for war purposes. They follow the old classification of "wet," "dry," and "mixed" varieties, noting other occasional forms, as cardio-pulmonary, chronic and relapsing, slight and indefinite.

Of 228 cases treated at the hospital Frisul, 45 of the wet type, 13 died, or 5·8 per cent. No new information was gained from three post mortem examinations made. Marked congestions and hæmorrhages were notified in the stomach and intestines and the degeneration of the Schwann areas of the large nerves was marked, but there was *no interstitial neuritis*. The disease was almost confined to the Indo-Chinese; in the African natives it was very rare. Most of the cases developed the disease before disembarkation or within a few days after, and generally the more unsatisfactory the conditions on board, the greater the number of cases. In no case could any spread of infection from the sick to the healthy on shore be traced, and there appears little possibility of these imported labourers spreading the disease among the indigenous population. The supposed epidemics in France which have been noted by CHANTEMESSE and RAYMOND are more likely scurvy than beriberi.

For prevention, the importance of providing good hygienic conditions and a dietary containing beans is insisted on. In discussing the etiology the authors say "it is perhaps premature to conclude that the polyneuritis of birds and human beriberi is identical," as among their cases they never noticed the cerebellar symptoms common in affected fowls, neither was the cure as rapidly brought about by change of diet.

P. W. B-S.

BARBE. *Considérations sur le béribéri observé en 1916 à l'hôpital de Sidi-Abdallah.*—*Arch. Méd. et Pharm. Nav.* 1918. June. Vol. 105. No. 6. pp. 457–465.

These observations were made in the summer of 1916 at the hospital of Sidi-Abdallah on 277 sick Annamites, of which 251 were cases of beriberi. Ten were of the oedematous, 191 of the dry, and 50 of the mixed form; 80 were classed as severe, 40 as mild, and 131 slight. There were seven deaths. In the dry cases the author noted weekly the power of walking, running, and squatting, and gives relative figures by which he was able quickly to summarise the course of each case.

120° C. in itself produced the disease in fowls, whereas if the food was heated to 100° C. for half an hour it did not do so. He found that salted meat exerted less unfavourable effects than the tinned meat which replaced it. The second change in the dietary made in 1894 was the reduction of the supply of peas. This caused an evident reduction of the anti-neuritic content in the ship's food. The third change was the replacement of the hard bread (biscuit) by white bread, to which was added a small amount of rye meal. It was noted that as a food, bread made with yeast was less detrimental to pigeons than bread made with baking powder. Rye bread was better than white bread, but still dangerous. He gives the following summary.

Norwegian beriberi runs the same course as tropical beriberi. The increased frequency of the disease coincided with three changes of food made in 1894, (1) replacement of salt by tinned foods; (2) reduction of the pea ration; (3) replacement of biscuit by soft bread, usually made from white flour. Each of the changes caused a reduction of the anti-neuritic material. The disease is, according to Norwegian experience, often cured by fresh vegetables, potatoes and fruit, but not always. Beer, eggs, and oats, are also useful.

[It is probable that ship beriberi is one of the deficiency diseases taking an intermediate position between scurvy and true beriberi; see DARLING, this *Bulletin*, Vol. 5, p. 107.]

P. W. B-S.

FERNANDEZ MARTINEZ (Fidel). *Découverte du béribéri dans la Péninsule Ibérique.*—*Gac. Méd. Catalana*. 1918. Mar. 31. Vol. 52. No. 978. p. 201. [Summarized in *Bull. Office Intern. d'Hyg. Publique*. 1918. Vol. 10. p. 831.]

The patient, aged 52, was a native of Alpujarras. The climate was varied, very hot in the summer and cold in winter. His diet consisted of very little meat, but much potatoes, rice, and maize. In the summer months it was mostly bread, cheese, and maize broth. Early in 1916 gastrointestinal symptoms were severe, followed some months after by acute muscular pains, with loss of tone and diminished reflexes. The case was then diagnosed as polyneuritis; later there was evidence of oedema with vaso-motor and cardiac signs, and a diagnosis of beriberi was made. He was treated with an anti-beriberi diet rich in vitamins, and after a month he had gained two kilos. in weight. Convalescence was complete and he returned to his home in good health.

The author states that this is the first case of beriberi recognised in Spain, but believes it probable that in Castile and the Basque provinces, other cases would be found if carefully looked for.

P. W. B-S.

YACOUB (Kamel). *Notes on Three Cases of Beriberi following Relapsing Fever and due to Prolonged Feeding on Condensed Milk.* *Practitioner*. 1918. Mar. Vol. 100. No. 3. (No. 597.) pp. 290-291.

Three cases of beriberi are described following an attack of relapsing fever, which, owing to gastric symptoms, were fed exclusively on

condensed milk. The disease was considered to be due to the want of a supply of the necessary vitamins. Two of the three cases died, one from progressive marasmus, and one was an example of the acute pernicious type.

P. W. B-S.

SHIM (H. S.). [Beriberi associated with Mental Disorders in Korea.]—*Chosen Igakukai Zasshi (Korea Med. Soc. Jl.)*. 1917. Aug. 28. No. 19. pp. 79-86.

[From Review by R. G. MILLS.]

During a period of five years 253 patients were admitted into the wards of the Government Hospital at Seoul with mental disorders, of which 70 were complications of beriberi, and 28 died. The mortality was greater among the Koreans than the Japanese, 75 per cent. as compared with 25 per cent. The physical condition of the former was worse on admission than the latter, probably owing to neglect, and it is important to note that practically all these developed this complication after admission to the hospital.

Symptoms appeared within nine months in 7, within six months in 38, under 2½ years in 7, and after a longer time in 18. The symptoms developed most frequently in the months of May, June and July, and the greatest death rate was one month later in each case. The outbreak was accredited to the inability of the patients to take their food and medicines properly. Dementia affected 40 per cent. of the cases, epilepsy, 72 per cent., paralytic dementia, 8 per cent. The majority of the patients were between the ages of 20 and 30.

P. W. B-S.

HONDA (K.). *Beiträge zur Pathologie der Beriberi*. [Japanese text.]—*Mitteil. Med. Gesellsch. z. Tokio*. 1917. Nov. 20. Vol. 31. No. 22. [Author's summary in German. Dec. 5. No. 23. pp. 2-4.]

In continuation of his previously published work the author has carried out a further searching investigation on 45 cases of beriberi, and includes changes found not only in the nervous system, but also in the intestines, muscles, and bones.

The vagus and sympathetic nerves are much less affected than the spinal nerves; the former are mostly made up of *fine fibres* which rarely show degenerative changes. The cardiac branches in the heart muscle, and the bronchial and oesophageal branches are usually unaffected; also the fine fibres, found sparsely with the coarse nerve fibres, in the spinal nerves remain just as unaffected as in the vagus and sympathetic. Throughout the peripheral nervous system the finer fibres are always more resistant to degenerative processes than the thick ones. The nerve cells in the sympathetic ganglia show changes, most marked in the coeliac ganglia. The author believes that the changes in the ganglionic cells of the spinal cord in beriberi are much less serious than they are generally supposed to be, and do not advance beyond a degree that can be quickly recovered from during convalescence; the changes are partly toxic and partly secondary ascending. It is the active degeneration of the Schwann cells in the sheath that causes the destruction of the nerve fibres, and these degenerative masses exercise, as foreign bodies, a certain irritation

on the adventitious cells, which become exuberant and wander into the perivascular spaces. The proliferated adventitious cells absorb the fat drops and retain them for a long period unchanged.

With regard to the lungs the author considers that the acute emphysema in "schoshin" cases (wet beriberi) must not be regarded as a result of changes in the vagus, and the increased volume of the lungs in those cases is due to congestion and oedema, the result of changes in the heart muscles, as thought by NAGAYO. The cirrhosis of the liver which is sometimes seen in Kakke (dry beriberi), and said to be characteristic by KASAI, also the tabes like changes in the spinal cord noted by DÜRCCK, are, in the author's opinion, not yet proved.

Among the changes in the muscular system in beriberi, two forms have to be differentiated, a primary which is caused directly by the Kakke toxin, and a secondary which is a consequence of changes in the nerve supply. Fatty degeneration and cloudy swelling do not march parallel with the degree of change in the nerves and they belong therefore to the first group of primary changes; the same holds good with regard to the fatty degeneration of the heart muscle. Wet beriberi may arise in any stage of alteration of the nerves; it is not always proportionately related to the severity of the phenomena of paralysis of the respiratory muscles and nerves of the extremities. Undoubtedly two forms of beriberi are to be distinguished, one attacking the nervous system; the acute exacerbations of a more or less chronic form of beriberi and the true "Shoshin" type are essentially the same, and are produced by an acute depression of the cardiac power. The easily altered character of the heart action is mainly caused by anatomical changes in the heart muscle, a direct result of the Kakke toxin; the influence of changes in the innervating nerves is, in the author's view, very trifling. In infantile beriberi the loss of voice is undoubtedly due to anatomical lesions of the innervating nerves, and consequently of the laryngeal muscles.

P. W. B-S.

OHNO (Seishichi). Ueber den Adrenalingehalt der Nebennieren bei der Kakkeleiche. [The Adrenalin Content of the Suprarenals in Beriberi Corpses.] [Japanese text.]-*Mittel. Med. Gesellsch. z. Tokio*. 1917. Mar. 5. Vol. 31. No. 5. [Author's summary in German. p. 1.]

The author estimated the amount of adrenalin in the supra-renals of ten acute and two nursing cases of beriberi, using COMESSATTI's chemical method, and found an increase over that present in normal bodies; also a definite hypertrophy of the medulla of the supra-renals associated with the increased secretion, but he was unable to state whether this has any causal connection with the diseased condition known as beriberi.

P. W. B-S.

SICARD (J. A.) & ROGER (H.). Le liquide céphalo-rachidien des béribériques.—*Bull. et Mém. Soc. Méd. Hôpit de Paris*. 1918. Feb. 21. 3 Ser. Vol. 34. No. 5-6. pp. 137-140.

The authors have carried out an investigation of the cerebrospinal fluid in beriberi in the Chinese at Marseilles to determine whether it would throw any light on the etiology of the disease. The wet form is associated with effusions into serous cavities, and it was thought that an increase of fluid might occur from the meninges and give rise to some of the nerve symptoms of the disease. The results

were entirely negative. Lumbar puncture rarely showed any alteration in pressure of the cerebrospinal fluid, and this gave no cellular evidence of inflammatory changes nor increase of albumen, neither were there any marked chemical alterations.

[Japanese have found an increase in pressure of cerebro-spinal fluid in acute cases. See OHIDA below.]

P. W. B-S.

OHIDA (H.). [**Examination of the Cerebro-Spinal Fluid in Beriberi.**]—*Chugai Iji Shimpo. (Home & Foreign Med. News).* 1917. July 5. No. 895. pp. 812-815.

[From Review by R. G. MILLS.]

In certain cases of beriberi the pressure of the cerebrospinal fluid was found to be increased; in acute cases it was found to be 180-280 mm., and in slight cases as low as 100. MUIRA has noted that when the cerebrospinal tension is high the blood pressure may be low. A case is reported when the former was 250 mm. and that of the blood 60-80. At the autopsy no meningeal lesion was found. It is possible that the vomiting found in late stages of severe cases may be due to central irritation from this increased pressure, as also the increased reflexes seen at the beginning of the attacks. In all cases the prognosis is grave when the pressure is markedly increased.

By experiments on rabbits the cerebrospinal fluid of a patient with a high pressure was found to have a powerful vaso-constrictor action.

P. W. B-S.

WEILL (E.) & MOURIQUAND (G.). **Syndrome béribérique expérimental chronique.**—*C. R. Soc. Biol.* 1918. Apr. 27. Vol. 81. No. 8. pp. 432-436.

Following the work of EYKMAN, VEDDER, CLARK, FUNK, VOEGTLIN and others the authors produced in birds and animals an acute paralytic condition by feeding them on decorticated or sterilized foods; the symptoms appearing between the 20th and 40th day, and being generally susceptible of cure by a change to diet which had the deficient anti-neuritic properties. This is similar to the acute condition of beriberi in man, but differs from the common chronic form.

The authors' investigations were carried out to produce a syndrome in birds which would be analogous to the latter. Pigeons were used. When fed upon a mixture of rice, barley, and maize, sterilized for $1\frac{1}{2}$ hours at 120° C., paralysis and death occurred between the 40th and 90th day. The food for the production of the chronic syndrome consisted of one third rice, barley, or maize, raw, and equal parts of the other two sterilised. By this method the paralysis did not appear until much later, 250 to 440 days. It commenced in the wings, later affecting the legs, and the return to normal diet did not produce a cure, thus differing from what occurs in the acute form.

From the experiments it would appear that the paralysis is clinically "functional" in the acute form, and that definite pathological lesions are produced in the chronic condition.

P. W. B-S.

JANSEN (B. C. P.). **Het gehalte aan in vet oplosbare vitamines in klapperolie.** [The Content in Fat-Soluble Vitamines of Cocoa-Nut-Oil.] [With abstract in English.]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1918. Vol. 58. No. 1. pp. 173-190. With 8 charts.

Recent research, chiefly by American laboratory workers, has shown that the accessory substances or vitamines may be divided into two classes, those that are water soluble (anti-beriberi vitamines) and fat-soluble substances. The latter should be demonstrable by their influence on the growth of a young animal. Cocoanut oil is a most important factor in native dietary and experiments were carried out on young rats to see whether it contained these fat soluble vitamines. The animals were fed on fat free food which contained enough protein and water soluble vitamines, which with an ether extract of egg yolk was sufficient for growth. When the latter was replaced by cocoanut oil on the contrary no growth promoting influences were obtained; therefore the author concludes that cocoanut oil is poor in fat soluble vitamines.

P. W. B-S.

KANEKO (G.). [The Action of Beriberi Serum upon a Frog Heart Preparation.]—*Chugai Iji Shimpō*. (*Home & Foreign Med. News*). 1917. July 5. No. 895. pp. 807-811.

[From Review by R. G. MILLS.]

INAKAKA, INADA and MIYAMOTO proved that the serum and milk of a nursing beriberi patient contained a toxin that would contract the heart of a frog. The author with more detailed experiments has definitely established this fact, though the reaction was not given by all the patients.

P. W. B-S.

VOEGTLIN (Carl), LAKE (G. C.) & MYERS (C. N.). **The Dietary Deficiency of Cereal Foods with Reference to their Content in "Antineuritic Vitamine."**—*Public Health Rep.* 1918. May 3. Vol. 33. No. 18. pp. 647-666. With 7 charts.

The authors carried out a large number of experiments on chickens and pigeons by feeding them on various forms of wheat grain, and flour of wheat prepared by different methods of milling. These confirm the work of other investigators. The chief points brought forward were that whole wheat or corn furnishes an adequate supply of anti-neuritic vitamine. The more refined the flour, the less vitamines are present and the more quickly symptoms of polyneuritis with loss of body weight are produced. The symptoms disappear with administration of highly concentrated preparations of anti-neuritic vitamines derived from whole wheat bread, yeast, ox liver, rice polishings or beans. They found that bread prepared with yeast, though it did not prevent the appearance of neuritis, delayed its onset. With a mixed flour containing a small amount of anti-neuritic vitamine, the body weight is maintained and the neuritis is prevented. They also consider that the total phosphorus content gives a fairly satisfactory

index of the amount of anti-neuritic vitamine contained in the food. A number of charts are given showing the variations of weight of the birds under experiment.

P. W. B-S.

VOEGTLIN (Carl) & MYERS (C. N.). **Phosphorus as an Indicator of the "Vitamine" Content of Corn and Wheat Products.**—*Public Health Rep.* 1918. June 7. Vol. 33. No. 23. pp. 911-917.

Much work has been carried out showing that the vitamine is not evenly distributed in corn grains. STANTON and FRASER showed that the phosphoric oxide, P_2O_5 , was a good indicator of the value of a sample. This has been to a great extent confirmed by other investigators. The authors have made a systematic analysis of different corn products, giving in detail their methods of estimating the quantity of P_2O_5 , and they are satisfied from their experiments that it yields satisfactory information as to the content of vitamine products or accessory foods.

Three tables are compiled showing these characters: (1) corn products—content in P_2O_5 and vitamins; (2) P_2O_5 content of various products from the same run of corn; (3) wheat products—content in P_2O_5 and vitamins. A diagram illustrates the flour milling process and distribution of phosphorus. They all show that where the vitamins (fat soluble and anti-neuritic) are high the P_2O_5 is also high.

Those interested in food questions should study these tables, which clearly demonstrate the facts, most of which however are fairly well known.

P. W. B-S.

HARDEN (Arthur) & ZILVA (Sylvester Solomon). **The Alleged Antineuritic Properties of a-Hydroxypyridine and Adenine.**—*Biochem. Jl.* 1917. Aug. Vol. 11. No. 2. pp. 172-179.

In 1916, WILLIAMS prepared and tested a series of substances which he hoped would possess anti-neuritic properties, mainly pyridine derivatives. He found three definitely active. With a-hydroxypyridine he obtained two crystalline modifications, needles and granules; with the needles he got cures or marked improvement in birds with polyneuritis in every case; the granules were inactive. He found the curative power did not last long and he believed the change was due to isomerisation. This isomerisation, if responsible for the loss of activity of the anti-neuritic principle, is of great scientific importance and interest, and it was the authors' object to study this in detail. WILLIAMS' methods were closely followed and the pigeons experimented on were carefully watched. Fifteen were treated, eight with a-hydroxypyridine and five with adenine, the substances being given intramuscularly.

After injection of a-hydroxypyridine needles into polyneuritic pigeons no cure or improvement in the condition was observed (thus differing from WILLIAMS' result).

Pure adenine, as well as adenine treated with sodium ethylate in a sealed tube for five hours at 100° C., yielded negative results. This was in agreement with VOEGTLIN, and WHITE, but in disagreement with WILLIAMS and SEIDELL.

P. W. B-S.

LEPORINI (F.). *L'Idropisia epidemica (Epidemic dropsy) in Cirenaica.* (Contributo alla conoscenza della patologia libica.)—*Polisclinico*. Sez. Prat. 1918. Feb. 10. Vol. 25. No. 6. pp. 133-134.

At Bengasi in North Africa the author has been the first to recognise a specific infective disease epidemic there and transmitted from man to man. It has some of the characters of beriberi but is more closely allied to the epidemic dropsy of India. The symptoms are low fever, vomiting, diarrhoea, anasarca, a peculiar rash, and marked anaemia. Death is finally due to pulmonary or cardiac complications, with pleural or pericardial effusions; the kidneys may show signs of amyloid degeneration post mortem and there is seen to be a general oedema with serous effusions.

Many theories are held as to its nature: a form of beriberi, a post-dysenteric anaemia, a deficiency disease, or a specific microbic infection, but nothing is known definitely. The author considers that for the present such cases should be described as exanthematous hydropic gastro-enteritis, and not as beriberi.

P. W. B-S.

UNDULANT FEVER.

BANCILHON (Jules). **Malta or Mediterranean Fever.**—*Internat. Clin.* 1917. 27 Ser. Vol. 2. pp. 178-192.

In this paper the author describes very fairly the characters of the disease and gives a clear description of the general clinical features. In so short a record it is impossible that all the peculiarities of this very protean and often chronic disease can be included, but very rightly the marked influence that the toxin has on the nervous system is emphasised. For omissions one may particularly mention the work that has been reported chiefly by Italian medical men on the infantile period, and also those rare cases of infectious endocarditis which occasionally occur in the course of acute cases. The fibrosis of the spleen and liver in chronic forms is also not mentioned. Though there is always a decrease in the polynuclear cells, the excessive high mononuclear increase is rather exceptional than common, as is inferred in the paper. Though the article contains nothing new, the reader cannot fail to derive much benefit from a clinical standpoint after a careful perusal.

P. W. B-S.

NICOLLE (Charles). **Sur une petite épidémie de fièvre Méditerranéenne d'origine caprine.**—*Arch. Inst. Pasteur de Tunis.* 1917. Oct. Vol. 10. No. 1-2. pp. 95-97.

A very interesting description is given of the epidemiological characters of a small epidemic of undulant fever which occurred in an outlying district at the foot of Mount Zaghuan. There were 9 cases among a family community of 14 persons who were divided into three groups. In the first there were 3 cases out of 4, in the second 5 out of 6, and in the third, 1 out of 4. In the second group the only one who escaped was nourished entirely on cow's milk. All the cases were proved by serological tests. An examination of the goats was made. There were 60 of these; 4 were undoubtedly infected and 50 were healthy. 26 were of Arabian breed and 3 of these were doubtfully infected. One was a pure Maltese and was definitely infected. 33 were of crossed breed giving 3 positives and 3 suspected cases. The infection therefore showed a preference for the Maltese or crossed bred animals. On further inquiry it was found that the infection was certainly brought into the herd by animals purchased from a distance of 40 kilometres and was spread by them among the herd. The infected animals were recommended to be killed at once.

P. W. B-S.

D'ALESSANDRO (Francesco). **Su di una complicanza non frequente dell'infezione melitense.**—*Policlinico.* Sez. Prat. 1917. Sept. 30. Vol. 24. No. 40. pp. 1213-1216.

It has long been known that in undulant fever the nervous system is frequently affected and Noël BERNARD has demonstrated that the

toxin of the micrococcus specially affects the human nerve cells. The author describes very freely the symptoms of a case in which the sequelae were very similar to those seen in Landry's paralysis. As a child of seven the patient had suffered from diphtheria, and this with the strain of war service had possibly predisposed the nervous system to a susceptibility for the toxin of the micrococcus.

P. W. B-S.

VINCENT (H.). Sur la prophylaxie de la Fièvre de Malte par l'immunisation active des animaux vecteurs du germe.—*C. R. Acad. Sci.* 1918. Feb. 25. Vol. 166. No. 8. pp. 359-362.

As goats were the most suitable animals for these immunity experiments, they were used by the author. Agar cultures of ten strains of *M. melitensis* were grown from these for four days, washed off and killed by ether (two hours exposure) and standardised; this polyvalent vaccine (10 *M.m.* + 1 *M.p.m.*) containing two milliards per cc. Two injections of 2 cc. each were given subcutaneously at intervals of 5-8 days.

To test the degree of immunity acquired, goats thus treated were inoculated subcutaneously, intravenously, and intraperitoneally with massive doses of virulent cultures, and also with infected food; they were found to be quite immune. ZAMMITT and others have shown that the micrococcus can be recovered from the organs of experimentally infected animals after 16 months. In post mortems on the immunised and subsequently inoculated goats, all the organs were found to be sterile.

The experiments show that the injection of killed vaccines has given to goats a strong immunity which protects against a large dose of the living virus introduced under the skin, in veins, in the peritoneum, and by the digestive tract. Three hundred animals have been tested with satisfactory results. The method, if carried out generally with goats, which are the chief transmitters of the micrococcus, would have the double result of protecting the animals and, indirectly, man himself from this severe and protracted disease.

P. W. B-S.

CHIRIACO (Pietro). Su la vaccinoterapia dell' infezione melitense. (Contributo clinico).—*Pediatrics.* 1918. May. Vol. 26. No. 5. pp. 282-284.

The author gives details of three cases in young children of severe attacks of undulant fever which were treated with intramuscular injections of a curative vaccine prepared by CARONIA and MARTELLI of Naples. In each case the injections rapidly produced cure of the disease, the fever terminating by crisis. In the first case a single injection of 2 cc. was given, in the second and third, two injections on alternate days. The great success obtained in these cases suggests that the vaccine is a very valuable curative agent and should be more frequently used.

P. W. B-S.

BYAM (W.). A Case of Malta Fever arising in England.—*Lancet*. 1918. June 22. p. 873. With 1 chart.

The patient, aged 50, gave a history of spending the winter of 1890–91 at Corfu and Athens, and of visiting Biarritz in 1896. The onset of the fever was in May, 1917, and as usual the diagnosis was not made for some months. In October the blood when tested gave negative reactions for typhoid and paratyphoids but agglutinated the *M. melitensis* in dilutions up to 1/500; this was approximately on the 144th day of the disease. The pyrexia was of an undulating character, sweats and rheumatic pains were marked, and he was much emaciated; the liver and spleen were both palpable. The micrococcus was not isolated from the urine. He was treated with a stock vaccine, commencing with one million and working up to 150 millions; 15 inoculations were given. The patient made a good recovery.

The origin of the disease was not traced, but it is suggested that since the war goats' milk has been used to supplement the supply of cows' milk; no definite association of this with the case, however, is given. It is interesting to note that in October a blood count gave only 24 per cent. polymorphonuclear cells per cmm, the lymphocytes being 61 per cent., a common character in chronic undulant fever; secondly, the chronically enlarged spleen due to the persistent toxic infection.

P. W. B-S.

EVANS (Alice C.). Further Studies on *Bacterium abortus* and Related Bacteria. II. A Comparison of *Bacterium abortus* with *Bacterium bronchisepticus* and with the Organism which causes Malta Fever.—*Jl. Infect. Dis.* 1918. June. Vol. 22. No. 6. pp. 580–591. With 3 figs.

During an extensive examination in the Research Laboratories of the Dairy Division, Bureau of Animal Industry, Washington, of the characters of *B. abortus* found in milk, a number of very interesting facts were elicited. Three organisms were found to be closely connected morphologically, culturally and serologically, viz., *Bacillus abortus*, *B. bronchisepticus* and *M. melitensis*, or, as the author prefers to call them, *Bacterium abortus*, etc., following the nomenclature used by the Society of American Bacteriologists.

The *B. abortus* and *B. melitensis* show the closest relationship in morphological and cultural characteristics, in biological reaction and habitat. FLEICHNER and MEYER report that as the result of inoculating guinea pigs they found that *B. abortus* is practically always present in the centrifuged cows' milk produced in the San Francisco Bay region, and *B. melitensis* is well known to be present in goats' milk on the island of Malta. The characters of the three organisms are described in detail, and a plate is given showing their similarity, morphologically, as cocco-bacilli. When first isolated from infected individuals the *M. melitensis* is always in the form of a coccus, the *B. abortus* is a cocco-bacillus with abundant coccoid forms; both in artificial cultivation tend to develop distinct bacillary elements.

It is well known that the *M. melitensis* tends to produce abortion in goats which are affected, and the infected animals may show no

other marked clinical changes. The same was found with animals infected with *B. abortus*, naturally and experimentally. Either organism develops agglutinins in the serum of infected animals acting upon both organisms.

The author, by absorption and other tests, concluded that "the two anti-sera contain more than one agglutinin, that the agglutinin in the two anti-sera are alike in kind but differ in proportion, and that the corresponding agglutinable substances are present in the two species of bacteria in different proportions." Culturally the *B. melitensis* tends to develop more brown colour than the *B. abortus*.

These investigations throw light upon the observations of KENNEDY and BASSETT-SMITH that the blood serum and milk of a considerable percentage of cows in London contain the agglutinin for the undulant fever organism [see this *Bulletin*, Vol. 3, p. 214, and Vol. 4, p. 7]. The only method by which the author could differentiate the two organisms was that the *B. melitensis* suspension agglutinated in higher dilutions with *melitensis* serum than did suspension of *B. abortus*.

[These observations are most interesting but further investigation and confirmation are required as to the true relationship of this group and their diagnostic value for man and animals. If the organism of undulant fever in its normal condition in the body is present as a micrococcus, there is no reason for changing its nomenclature.]

P. W. B.-S.

ASHE (E. Oliver). Galyl in Malta Fever.—*S. African Med. Rec.* 1918. 12 Jan. Vol. 16. No. 1. pp. 4-5.

Two cases diagnosed as chronic undulant fever were each treated with .3 gm. of galyl with apparently most satisfactory results, but it is stated that from 1/3rd to 1/2 of the injection failed to enter the veins, and caused moderately severe local trouble in each case. The author suggests that the slow absorption of the drug thus induced might have been the cause of the beneficial results. [This seems a poor argument founded on bad technique.]

P. W. B.-S.

YAWS.

MAUL (Herman G.). Bone and Joint Lesions of Yaws with X-Ray Findings in Twenty Cases. (Proc. Manila Med. Soc.).—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1917. Sept. Vol. 12. No. 5. pp. 258–260.

Maul states that of 100 cases of yaws which he examined he found 20 per cent. to be suffering from bone and joint lesions. A roentgenological survey of all the bones in the body was made in each of these 20 cases and photographs were taken in order that the progress of the lesions under treatment might be followed.

“In the majority of cases the lesions show as rarefied areas, irregularly oval or elliptical in shape, with the long axis parallel to that of the bone in which the lesions are located. The size varies from the smallest discernible area to one which is 2 or 3 centimeters in length. The rarefaction presents moderately well-defined borders separating it from the unaffected bone and varies in translucency from the slightest differentiation of unnatural transparency to one simulating a perforation. Most of the lesions appear to originate in the interior of the bone, while a number can be seen as small excavations on its outer surface. When the lesion is on the surface of the bone, the periosteum is usually destroyed, but occasionally the cortex shows thickening and the periosteum is separated from the bone.”

Within the joints the damage is usually found to be located on those articular surfaces which are most exposed to trauma and the author concludes that the joint pains in yaws are due to the presence of lesions of this nature on the articular surfaces.

The author states that the bone lesions of yaws may simulate :— (1) Tubercular or septic central abscess, (2) Gumma, (3) Hydatid cyst, (4) Benign cyst, (5) Fibrous osteitis, (6) Enchondroma, (7) Endothelioma, (8) Secondary carcinoma, (9) Myeloma, and (10) Sarcoma.

The differential diagnosis is made by combining the radiographic appearances with all the clinical data.

CASTELLANT's treatment was noted to cause a gradual disappearance of the bone and joint lesions; but salvarsan is a specific in these cases and rapid regeneration of the bone follows its use. The regeneration of the bone is complete at the site of the lesions, provided that too great destruction has not already taken place.

R. P. Cockin.

VIOLLE (H.). Sur un cas de pian observé en France.—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 784–786. With 1 fig.

An account of the case of a young Malagasy labourer who arrived in France in June 1917, and who, upon embarkation, was apparently perfectly fit. In the middle of July he was found to be suffering from yaws. The eruption was confined entirely to the face and the patient stated that it had developed subsequent to injection with anti-typhoid serum. The eruption persisted for several weeks and eventually cleared up after injection of galyl, followed by the administration of potassium iodide. [Neither doses nor number of injections of galyl are recorded.]

The blood examination showed a slight hyperleucocytosis, in which the large mononuclears were increased. The Wassermann reaction was positive, and *T. pertenue* was found abundantly in all the lesions. The patient is stated to have come from the vicinity of Antananarivo, where yaws is endemic.

R. P. C.

PUPO (João de Aguiar). *Contribuição ao estudo da Boubá. Memoria apresentada ao Primeiro Congresso Medico Paulista.* [A Contribution to the Study of Boubá (Yaws). A Memoir presented to the First Medical Congress at S. Paulo.]—*Ann. Paulist. Med. e Cirurg.* 1917. Jan. Year 5. Vol. 8. No. 1. pp. 1-8. With 2 figs.

A short paper describing four cases of the disease known in Brazil as boubá, which the author identifies with *Framboesia tropica*, pian or yaws. *Spirochaeta pallidula* (Castellani) was detected in the lesions in each case and the Wassermann reaction was positive. The cases quickly got well on injections of neo-salvarsan. In the author's opinion the cases recently described by Professor BREDA of Padua, as Brazilian boubá, were cases of leishmaniasis, coming from certain regions of the State of San Paulo where that disease is certainly endemic.

J. B. Nias.

GREGGIO (G.). *Treatment of Yaws and other Diseases in the Belgian Congo by Neosalvarsan.*—*Trans. Soc. Trop. Med. & Hyg.* 1917. July. Vol. 10. No. 8. pp. 189-190. With 4 plates.

In this paper Greggio states that neosalvarsan has been extensively used among the tribes of the Inkissi Valley, in the middle of Belgian Congo, and that, in a period of less than three years, about 500 negroes have been treated by this method. The "inoculations" are stated to have been "completely successful."

Of the 500 cases quoted it is impossible to tell how many are yaws, syphilis or gangosa. These diseases were all represented [as is obvious by referring to the excellent plates which illustrate the article] and possibly other diseases. In the discussion on this paper Major Aldo CASTELLANI stated that mercury has no influence whatever on yaws and the most rapid curative effects are obtained by the injection of salvarsan. In the absence of salvarsan, and a medical man to administer it, he recommends the following treatment which has given him good results:—

R./.	Tartar emetic	..	..	..	$\frac{1}{2}$ -1 grain.
	Pot. Iod.	..	..	..	1 drachm.
	Sod. Salicyl.	..	..	..	10 grains.
	Sod. Bicarb.	..	..	..	15 "
	Chloroform Water to	..	..	..	1 ounce.
Sig./	One ounce thrice daily.				

[Dr. WILLIAMS recommends that two drachms of glycerine or syrup be added to this mixture, which will maintain it as a clear solution for weeks.]

R. P. C.

BROERTJES (P.). Eenige aantekeningen over het gebruik van Salvarsan en Neosalvarsan bij framboesia tropica. [The Use of Salvarsan and Neo-Salvarsan in Yaws.]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1917. Vol. 57. No. 3. pp. 418-430.

Notes on the treatment of yaws in 950 cases (natives, Chinese and Klings), 285 being adults and 665 children.. In 20 cases treated with old salvarsan a cure was obtained after one injection, in periods ranging from 3 days, as a minimum, to 16 as a maximum. Recourse was then had to neo-salvarsan, as causing less constitutional disturbance, for the remainder of the cases, with the result that the average time of cure was 14 days. One patient only needed a second dose, and was cured in a month.

J. B. N.

DA MATTA (Alfr.). La Tréponémose de Castellani (Boubas) et son traitement par les arsenicaux et l'émétique.—*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 863-865. With 1 plate.

The author claims to have succeeded in curing a Brazilian farmer with an extensive eruption of yaws by means of tartar emetic and cacodylate of soda. The tartar emetic was administered intravenously in a one per cent. solution, doses of 5, 8, 10 and 10 cgm. being given on alternate days. After this series of injections was completed, the author gave sodium cacodylate in 10-15 cgm. doses, daily for six days. The sores were covered with pads soaked in a solution of tartar emetic (5 dgm. per cent.) and was well tolerated.

JEANSELME is quoted as stating that perionychia plays an important rôle in the dissemination and transmission of this disease and this condition, he considers, may account for its obduracy under treatment.

R. P. C.

GUERRERO (Luis), DOMINGO (E.) & ARGUEELLES (M.). Further Observations on the Treatment of Yaws with Castellani's Formula. (Proc. Manila Med. Soc.)—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1917. Sept. Vol. 12. No. 5. pp. 257-258.

In consequence of the difficulty of obtaining salvarsan and neo-salvarsan, and also of inducing natives to submit to the injection of these drugs, the authors have been using Castellani's formula in the treatment of 43 Filipino cases of yaws. Their results show that 24 patients completely recovered, 7 improved, 5 had relapses in from 2-5 months and 7 showed no improvement. The authors consider that "the continuation of the treatment after the lesions have healed (from 5-10 days treatment with intervals of from 10-15 days) will ensure a permanent cure." The treatment is carried out, during the active stage of the disease, by administering the formula for 10-15 days and after an interval of 5-10 days repeating it for a further 5-15 days. The treatment is stated to be particularly effective in recent infections—but all forms of the disease respond.

R. P. C.

HARPER (P.). i. **Treatment of Yaws.**—Legislative Council. Fiji. 1917. Council Paper No. 11. 3 pp.

——. ii. **Yaws as a Distinct Disease In Fiji.** With a Note by Dr. G. W. A. LYNCH, Chief Medical Officer.—*Ibid.* No. 54. 2 pp.

i. In reply to the question whether salvarsan and its substitutes really cure yaws the author quotes three cases which he treated over five years ago and which have remained well since. Several others have been followed for less periods without recurrence. A table shows the chief manifestations of yaws in 542 cases. After "sokis" or crab-yaws with 227 and rheumatism ("sasala") with 160 records the most common was "kakaca" or "vula" with 158.

"In this affection the first change is a desquamation over a number of very small areas of skin. Then follows pitting and fissuring of the skin, then loss of natural pigmentation with often a bright red or beautiful flesh-pink colour. The final stage is a dead-white atrophic area, often mistaken by laymen for leprosy. The relative amount of splitting, fissuring, or pitting seems to depend on the hardness of the skin, these conditions being much more marked in the hard plantar or palmar surfaces, whereas on the softer skin the condition may pass from desquamation to depigmentation without any pitting or fissuring being noticeable. From the table this kakaca will be seen to be one of the commonest manifestations of tertiary yaws. It is usually confined to the palms and soles, but sometimes extends up the limbs and I have occasionally seen it affecting the lips and chin. When affecting the palms it is a frequent cause of Dupuytren's contraction."

ii. Practically every Fijian suffers from yaws, usually between the 2nd and 6th years. Aneurism, G. P. I. and locomotor ataxy occur frequently, perhaps once for every thousand of the population. These are due to yaws and not syphilis because (1) no manifestations of hereditary syphilis in infants are seen, (2) Hutchinson's teeth are not seen, (3) he has never seen a Hunterian chancre nor the scar of one in a Fijian, (4) though many Europeans live with Fijian women none has been found infected with syphilis. "As long as a European keeps to a Fijian woman he is considered to be safe as regards venereal disease." (5) The response to mercury and arsenicals differs from that of syphilis. In Dr. Harper's opinion Dr. Lynch concurs.

A. G. B.

SPRUE.

DOLD (Hermann). Further Note on the Micro-Organisms found in Sprue in China.—*China Med. Jl.* 1918. Jan. Vol. 32. No. 1. pp. 35-37.

In the numerous specimens of sprue stools examined by Dold in China in the last 3½ years either blastomycetes or oidia, or both, were regularly found in much larger numbers than in other stools. With prolonged cultivation on various media great morphological variations were observed, from blastomycete types to oidium types and vice-versa, and to smaller bodies impossible to differentiate from ordinary cocci, cocco-bacilli, and bacilli. Cultural changes and changes in chemical activity were also observed. These variations are considered not to be impurities or symbiotic organisms, but forms of development of the sprue organisms, which appear to be subject to a number of great morphological and biological variations.

F. E. Taylor.

DOLD (Hermann) & FISCHER (Walther). Anatomical Findings in Experimental Sprue.—*China Med. Jl.* 1918. Mar. Vol. 32. No. 2. pp. 125-131.

Dold has succeeded in experimentally producing typical sprue diarrhoea in animals (white mice and monkeys) by feeding them with the organisms isolated from cases of human sprue. He finds that in white mice the infection takes place easily and almost regularly but that it is more difficult to produce the sprue diarrhoea in monkeys.

In this paper there appears a detailed account of the anatomical and histological findings in animals which succumbed to experimental sprue infection *per os*.

Dold and Fischer found that throughout the alimentary tract from the tongue to the anus, organisms of the *Blastomyces* and *Oidium* types with their modified forms were present on the surface of the epithelium, in some parts (small intestines and caecum) in very great numbers, and that an ingrowth into the deeper layers of the tissue often occurred. They consider that this result is quite in accord with the autopsy findings of BAHR in cases of human sprue and that the circle of evidence is thus closed in favour of the conception that sprue is due to an overgrowth of microbes of the *Blastomyces* and *Oidium* type in the entire alimentary canal.

F. E. T.

BIRT (Edmund). Beitrag zur Klinik des Sprue. [A Contribution to the Clinic of Sprue.]—*Deut. Arch. f. Klin. Med.* 1916. Oct. 10. Vol. 120. pp. 460-480.

Birt, who is a member of the staff of the German Medical School for Chinese at Shanghai, records six cases of sprue which he has observed in Shanghai. Improvement was obtained in all the cases except one which was fatal, and a description of the autopsy findings of this case is given. Birt considers that each case needs individual treatment, both as to drugs and diet, but in every case alcohol and more especially tobacco are to be rigidly forbidden. Benefit appears to have been derived in some of the cases from the administration of an autogenous vaccine prepared by DOLD from cultures obtained from the sore tongues of the patients.

F. E. T.

JOUIN (A.). **Un cas de diarrhée chronique des pays chauds (Diarrhée de Cochinchine. Sprue) rebelle à tous les traitements, guérie en quelques semaines par l'Héliothérapie marine aidée de la Thermo-thérapie (méthode du Dr. Miramond de Laroquette).**—*Bull. Soc. Path. Exot.* 1918. Vol. 11. No. 1. pp. 18-19.

A marine officer aged 30 contracted chronic diarrhoea in Setchouen and was invalided home to France in a very emaciated condition. The stools presented the characters of sprue stools, and contained neither amoebae, amoebic cysts nor dysentery bacilli. Sulphate of soda, tannigen, hordenine, horse serum, lactic ferments and hepatic and pancreatic opotherapy produced no effects. After six months leave and against the advice of several physicians the patient decided to return to the East and embarked on an auxiliary cruiser. Whilst traversing the Mediterranean the ship's doctor, having greatly improved a similar case of chronic diarrhoea from Cochinchina, decided to employ MIRAMOND DE LAROQUETTE'S method of treatment. For an hour each day the patient was exposed quite naked to the intense solar radiations of this district and each evening in the cabin the abdomen was exposed for a quarter of an hour to the rays of a series of electric lamps. Improvement was rapid and at the end of ten days a formed stool was passed, the first time for over a year. Two years later the patient had resumed a normal life, could eat everything, and except for an occasional slight attack of diarrhoea appeared to be perfectly well.

F. E. T.

ROGERS (Leonard). **Four Years' Further Experience of Autogenous Oral Streptococcal Vaccines in the Treatment of Seventeen Cases of Sprue.**—*Indian Med. Gaz.* 1918. Apr. Vol. 53. No. 4. pp. 121-126.

In 1914 Rogers reported two cases of sprue successfully treated by streptococcal vaccines made from cultures from the sore tongue and mouth [see this *Bulletin*, Vol. 5, p. 227]. Although both were advanced and chronic cases the recoveries have been maintained for three years after the treatment ceased. He now records a series of seventeen consecutive cases, being all those he has treated during the last four years of which he has any detailed records. Marked benefit is claimed in every case except one in which the patient, who had suffered from sprue for fifteen years, gave up the treatment after only ten weekly injections had been administered.

The vaccine is made up to 100 million streptococci per cc. with carbolised saline heated to 56° C. for one hour. The commencing dose is $\frac{1}{2}$ cc. and is increased by $\frac{1}{2}$ cc. to 2 cc. at intervals of from 5 to 10 days. The injections are nearly painless and usually have to be continued for from three to six months in typical cases and occasionally for longer with intervals of omissions.

Rogers claims that these results confirm his view that sprue is essentially a streptococcal infection, originating in the mouth and spreading down the intestinal canal.

F. E. T.

ENTERIC FEVERS IN THE TROPICS.

BONEY (T. K.), CROSSMAN (L. G.) & BOULENGER (C. L.). **Report of a Base Laboratory in Mesopotamia for 1916, with Special Reference to Water-Borne Diseases.**—*Jl. Roy. Army Med. Corps.* 1918. Apr. Vol. 30. No. 4. pp. 409–423. With 1 chart.

Enteric Group Diseases :—

The methods employed for identification of species were :—

- “(1) Reaction and amount of gas, if any, in mannite tube.
- “(2) Character of growth on agar and motility.
- “(3) Reaction to specific serum.”

“The behaviour of the paratyphoids in mannite peptone water differed markedly. As a rule *paratyphosus* B formed acid and gas vigorously. . . .

“Of ninety-five strains of *paratyphosus* A there was no gas formation at all in twenty-eight. In sixty-four, there was slight gas formation at the end of twenty-four hours, very often merely a bubble.”

“A certain number of anomalous organisms were isolated . . . which could not be referred to any group, although from the delicate nature of the growth and other reasons, they did not appear likely to be contaminations.”

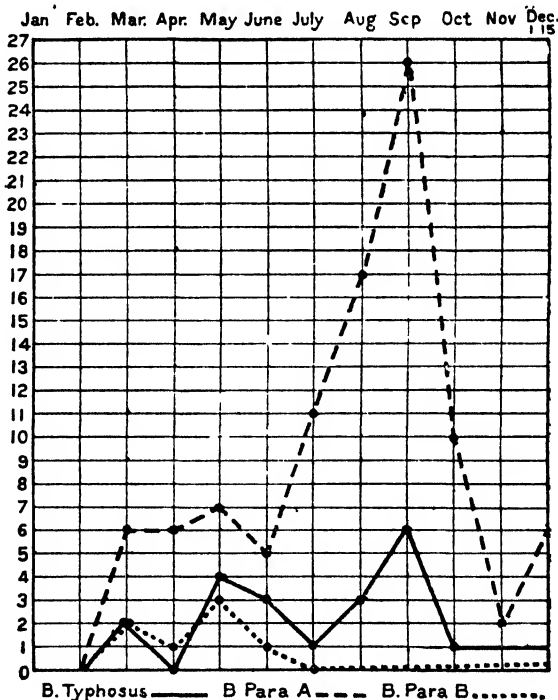


Chart showing the Monthly Incidence of Enteric Group Disease by Blood Culture.

[Reproduced by permission from the *Journal of the Royal Army Medical Corps.*]

The figures given for positive "Blood cultures" confirmed the general belief that success is unlikely after the 10th day [v. KABESHIMA, below.]

Summary of Enteric Group.

Total number of cases diagnosed				T.	..	..	139
Jan. 1 to Dec. 31, 1916				A.	..	..	433
				B.	..	..	89
Organism isolated in 141 :—							
Blood .. 125	T.	..	22=17.6%	total positives	=	5.7%	total cultures.
	A.	..	96=76.8%	"	"	=	25%
	B.	..	7=5.6%	"	"	=	1.7%
Stools .. 16	T.	..	5				
	A.	..	11				
	B.	..	0				

Diagnosed by agglutination :—

520	T.	..	112=21%	total positives	=	8.9%	total agglutination.
	A.	..	326=62%	"	"	=	25.4%
	B.	..	82=15.4%	"	"	=	6.3%

Referring to the protective value of anti-enterica vaccines the authors write :—

"With regard to T.A.B., if its value be as great [as that of old typhoid vaccine] it is a little surprising to find the incidence of *paratyphosus* A so high in men inoculated within six months of the onset. As a matter of fact nearly all these cases occurred within four months of inoculation, and some a good deal less than this."

[It is well known that an attack of paratyphoid A fever provokes only a small amount of "antibody" and that the agglutination reaction is of low titre, or absent. After the disease, and following vaccine inoculation, the Widal reaction diminishes rapidly, cf. COPPINGER and GIBSON, this *Bulletin*, Vol. 8, pp. 91-95; the charts are especially interesting: SVESTIKA—Vol. 8, p. 99; also SLUKA, Vol. 11, p. 438.]

J. H. Tull Walsh.

FLETCHER (William). Report upon the Bacteriological Examination of One Thousand Soldiers convalescent from Diseases of the Dysentery and Enteric Groups. —*Jl. Roy. Army Med. Corps*. 1917. Nov. & Dec. Vol. 29. Nos. 5 & 6. pp. 545-559; 679-693. With 3 charts; and 1918. Jan. Vol. 30. No. 1. pp. 51-75. With 1 photograph.

The following is reproduced from the part of the author's summary which is concerned with enteric fevers :—

"(1) *Brilliant-green Enrichment and the use of Telluric Acid.*

"(a) The employment of brilliant-green is of the greatest value in the detection of carriers of organisms belonging to the Gaertner group.

"(b) When brilliant-green enrichment is used, it is imperative that, in addition, plates be spread direct from the excreta; because brilliant-green exerts an inhibitory influence upon the growth of organisms belonging to the Eberth group. If the brilliant-green method be employed alone, infections of the Eberth group will be overlooked; if direct plating be employed alone, infections of the Gaertner group will be missed. Both methods should be used.

"(c) The samples of telluric acid, employed in this laboratory, inhibited the growth of paratyphoid and dysentery organisms.

"(2) *Carriers of B. paratyphosus A.*

"(a) *B. paratyphosus* A was isolated from the excreta of six convalescents, i.e., 0.6 per cent.; in one case it was recovered from the urine, and in five from the faeces. . . .

"(g) Judging from the results of the examination of 846 convalescents, from France, paratyphoid fever of the 'A' type was of rare occurrence in that country during 1916-17.

"(3) *Carriers of B. paratyphosus B.*

"(a) *B. paratyphosus B* was isolated from the excreta of 35 convalescents, i.e., 3.5 per cent. In 9 cases the organisms were isolated from the urine, and in 26 from the faeces. . . .

"(e) Fifteen of the patients, from whose faeces *B. paratyphosus B* was isolated, had been inoculated with a mixed vaccine of typhoid and paratyphoid organisms. None of the five chronic carriers had received a prophylactic inoculation with a paratyphoid vaccine.

"(f) Three precocious carriers of *B. paratyphosus B* were met with. People who became infected with paratyphoid fever may disseminate the germs of the disease during the stage of incubation while they yet appear to be in their usual state of health. . . .

"(h) Judging from the result of the examination of convalescent patients at this hospital, paratyphoid fever, of the 'B' type, was the commonest disease of the enteric group in France during 1916-17.

"(4) *Prophylactic Inoculations with a Mixed Typhoid-paratyphoid Vaccine.*

"(a) Paratyphoid bacilli were isolated from the excreta of men who had been inoculated with a mixed typhoid-paratyphoid vaccine. . . .

"(5) *Carriers of B. aertrycke.*

"(a) *B. aertrycke* was isolated from the excreta of three convalescents : 0.3 per cent. In one instance the organism was isolated from the faeces and in two from the urine.

"(b) The three patients had come from France.

"(c) From each patient the organism was isolated on one occasion only.

"(d) Two of the strains isolated were of the 'Newport' type; the third strain did not absorb the specific agglutinins from a serum of either the 'Mutton' or the 'Newport' type.

"(6) *Carriers of Anomalous Organisms of the Salmonella Group.*

"(a) Such organisms were of frequent occurrence. The two commonest types were non-motile, and produced indol in peptone-water. One of these types produced acid and gas in dulcitate, the other did not.

"(b) The frequency with which the different members of this group of organisms occurred in the excreta was subject to very sudden changes; one type of organism might be present in a large proportion of the samples examined during a period of ten days or so, and then disappear altogether; to reappear, perhaps, weeks or months later.

"(7) *Carriers of B. typhosus.*

"(a) *B. typhosus* was isolated from the excreta of eight patients, i.e., 0.8 per cent. In five cases the organism was isolated from the urine, in two from the faeces, and, in one, from both the urine and the faeces. . . .

"(11) *The Vitality of Paratyphoid Organisms in the Excreta of Carriers.*

"(a) Paratyphoid bacilli may remain alive in the solid excreta of a chronic carrier for more than forty days.

"(b) If the faeces of such a carrier be mixed with ordinary unsterilized tap-water or with sterile salt-solution, the infecting organisms may remain alive for more than 100 days.

"(c) Paratyphoid organisms were not found to exhibit the same vitality in the excreta of convalescent carriers.

"(d) The study of the vitality of the infecting organism in carriers may prove to be of value in prognosis."

J. H. T. W.

TEISSONNIÈRE (M.), BÉGUET (M.) & JOLLY (R.). *Remarques sur les hémocultures pratiquées au Laboratoire de Bactériologie de l'armée d'Orient du mois de juin au mois de décembre 1917.*—*Bull. Soc. Path. Exot.* 1918. Mar. Vol. 11. No. 3. pp. 154-156. With 1 chart.

The authors made 1,020 blood cultures during the period stated in the title. Of these 197 were positive. *B. typhosus* was isolated in 59 cases; *B. paratyphosus A* in 100; *B. paratyphosus B* in 38 cases.

They note the marked predominance of Paratyphoid A infections especially from July to December 1917. Among the 197 positive cultures 31 came from non-vaccinated persons and 55 from persons that had received protective vaccination more than a year before; 71 came from persons whose times of vaccination were less than a year.

J. H. T. W.

DE VÉZEAUX DE LAVERGNE & GAUTIER (Cl.). **Syndromes dysentériques à bacilles paratyphiques A.**—*Bull. et Mém. Soc. Méd. Hôpit de Paris*. 1918. June 28. Vol. 42. No. 23-24. pp. 700-702.

The authors state that during October and November 1917 a small outbreak of dysentery occurred among certain French soldiers. Forty-five "stools" were examined. Shiga's bacillus was found in one; in eleven the bacillus was either that of Flexner or that of Hiss, and in three cases they found *B. paratyphosus* A. From a clinical point of view the three patients presented a clear picture of the dysentery syndrome; the "stools" contained blood and mucus, the number varied from six to fifteen daily and tenesmus was present. The patients recovered in about a fortnight. In one case the serum agglutinated *B. paratyphosus* A up to 1 in 150, but gave no agglutination with the bacilli of Shiga or Flexner above a dilution of 1 in 100. It was noticed that at the time these cases occurred cases of paratyphoid A fever were more common than previously. Later they met with another case: An Algerian labourer was brought to the hospital in a dying condition due to dysentery. The stools gave an almost pure culture of *B. paratyphosus* A. At the *post mortem* examination ulcers were found in the small intestine, in the caecum, colon and in the rectum.

J. H. T. W.

FRIEDLANDER (Alfred) & McCORD (Carey P.). **The Atropin Test in the Diagnosis of Typhoid Infections.**—*Jl. Amer. Med. Assoc.* 1918. May 18. Vol. 70. No. 20. pp. 1435-1438. With 5 charts.

"A series of 170 nontyphoid patients has been tested with the atropin reaction in the manner described as reliable for establishing the presence or absence of typhoid or paratyphoid infections. Thirty-six per cent. of the number examined yielded results characteristic of typhoid. Those cases giving reactions typical of typhoid without any evidence of typhoid existence were distributed over thirteen diseases. It is concluded from so high a percentage of discrepancies that the atropin reaction is without especial value in the detection of typhoid infection." [See Medical Research Committee (MARRIS), and MASON, this *Bulletin*, Vol. 11, pp. 432 & 437.]

J. H. T. W.

MARRIS (H. Fairley). **Tachycardia: Observations upon its Occurrence in the Enteric and other Fevers.**—*Lancet*. 1918. May 11. pp. 667-670. With 5 charts & 4 diagrams.

The author states:—

"The foregoing observations justify a classification of the tachycardias occurring during the convalescence of the enteric group of fevers into

the following three groups: (1) Due to cardiac lesions; (2) postural or atonic; (3) due to general instability of the vaso-motor nervous system."

"In a series of 650 cases of the enteric group of fevers tachycardia of sufficient degree to attract attention was observed in 75 cases; 5 of these were judged to be cardiac in origin, 40 were due to vaso-motor instability, 10 were of the postural variety, and the remainder presented features suggestive of groups 2 and 3."

Investigation of Cardio-vascular System after Inoculation.

"Further light is thrown upon the vaso-motor variety" by the investigation of some 20 cases during the first two weeks after inoculation against enteric fevers. Two of these are described:—

Case 5.—man, aged 25, uninoculated admitted as a suspected case of typhoid. No bacilli were found and after 5 days slight "fever" he appeared fit and well; 16 days after "fever" terminated he was inoculated (having been for six days in bed) with 0.5 ccm. of the "T.A.B." vaccine. The chart shows that blood pressure and pulse rate were normal. Heart in every way sound. Severe reaction followed the dose, blood pressure fell abruptly; pulse rate rose but erratically. Eleven days later 1.0 ccm. of the vaccine was given. Thence onwards blood pressure curve unduly high; waking pulse rate 110 to 120; sleeping pulse rate normal. General condition similar to that of *Case 3* (Paratyphoid A fever); tremor, sweating, clammy hands, dermographia and tachycardia. Remained much the same for a fortnight. The effect of exertion was then studied and after slight effort breathlessness, palpitation and discomfort were noted. Evacuated as a case of debility.

"The inference is that, not only active infection by organisms of the enteric group, but also an emulsion of dead bacilli may give rise to a vaso-motor tachycardia. I have examined a considerable number of cases described as D. A. H., and the resemblance between these and Cases 3 and 5 is striking."

"To-day all cases coming under my care showing this type of tachycardia are detained, as I believe that such a condition arising after any febrile disorder should not be regarded too lightly and returned to duty."

J. H. T. W.

BAUJEAN (R.). *Méningite typhique suppurée chez un Malgache, porteur biliaire de germes.*—*Bull. Soc. Path. Exot* 1918. Apr. Vol. 11. No. 4. pp. 264-267.

This case presents two interesting features:—As a case of suppurative meningitis without the usual symptoms of typhoid fever; and as an instance of a "carrier" from whose bile, after death, a pure culture of *B. typhosus* was obtained.

The "fever" with headache, stiff neck and signs of acute meningitis led to lumbar puncture. The spinal fluid contained pus and from it a bacillus was cultivated having all the characteristics of *B. typhosus*.

Agglutination Reaction.

Dilutions.	$\frac{1}{100}$	$\frac{1}{1,000}$	$\frac{1}{5,000}$	$\frac{1}{10,000}$	$\frac{1}{15,000}$	$\frac{1}{20,000}$
Anti-typhoid serum ..	+	+	+	+	+	+
Anti-para. A. " ..	+	—	—	—	—	—
Anti-para. B. " ..	+	+	—	—	—	—

The patient, admitted to hospital on February 23rd, died on February 29th. Blood culture made on February 28th was negative.

There was no ulceration of the intestines; the spleen was not enlarged but juice from this organ gave a culture of the bacillus. The walls of the gall bladder were much thickened and *B. typhosus*, in great number, was the only bacillus present. The vessels of the pia mater were much congested; there was much thick pus at the base of the brain but none upon the upper surface of the hemispheres. This pus contained the bacillus in great quantities.

J. H. T. W.

PEARSON (A.). Typhoid Vaccine employed as a Therapeutic Measure during the Course of the Disease.—*S. African Med. Rec.* 1918. June. 8. Vol. 16. No. 11. pp. 164-167.

During 1915 cases of typhoid fever, in the native hospital at Lubambashi, were treated with injections of vaccine. The usual dose of subcutaneous injections was 500 million bacilli; for intravenous injection 50 million. Non-vaccinated cases were registered as controls. The dose was repeated every 6 or 7 days.

				Vaccinated.	Non-Vaccine Cases.
Number	..	..	..	80	77
Mortality	..	..	..	13·8%	15·6%

The author writes: Improvement followed in 58 cases out of 80; in 12 there was no improvement; in 3 cases some injections were followed by improvement, others were not; in 6 cases death occurred before effect of vaccine could have been manifested; in one improvement started before vaccine was used.

On the whole the results agree with those of previous writers who have used vaccines for treatment of enteric fevers. Dr. Pearson thinks that vaccines prevent relapses, shown in his table as:—"For vaccine cases 8·7 per cent.;" "For non-vaccine cases 17 per cent." [cf. WHITTINGTON, this *Bulletin*, Vol. 9, p. 22; also GAY, Vol. 11, p. 440].

J. H. T. W.

DIÉNERT (F.), GUILLERD (A.) & LEGUEN (Antoine). De la recherche des bacilles d'Eberth et paratyphiques B dans les eaux.—*C. R. Acad. Sci.* 1918. Jan. 14. Vol. 166. No. 2. pp. 84-85.

Previous investigations by Diénert and MATHIEU [this *Bulletin*, Vol. 9, p. 471] had shown the value of "malachite green" as a medium for separating Enterica species from *B. coli*. This method is now generally employed for detecting *B. typhosus* and *B. paratyphosus* in samples of water taken in, and around, Paris.

Several litres of the water are filtered in order to concentrate the germs. The deposit on the filter is then suspended in 50 cc. sterile salt solution and inoculated into 50 cc. peptone water to which is added 3 cc. of sterile bile and 2·5 cc. of malachite green 1 in 200. The whole amount is incubated at 37° C. for 24 hours. Colonies are then removed; and again at the end of 48 hours. Eberth's bacillus and *B. paratyphosus* B produce brown colonies surrounded by a paler

aureola, while those of *B. coli* are only slightly coloured and have no aureola. These colonies are isolated and tested by various well known methods and by the agglutinin reaction.

J. H. T. W.

WILSON (W. James) & DARLING (Georgina). **Useful Media for Isolation and Cultivation of Meningococcus, Enterococcus, and *B. typhosus*.**—*Lancet*. 1918. July 27. p. 105.

The medium of interest to readers of this sub-section is No. 3:—

“A brilliant green lactose bile-salt agar medium: lemco 10 g., agar 30 g., peptone 20 g., sodium tauro-cholate 5 g., sodium chloride 5 g., and lactose 5 g. per litre. Reaction of medium is adjusted to + 10 (Eyre) and 0.4 cc. of 1 per cent. solution of brilliant green added to each 100 cc. of melted medium which has been cooled to 50° C. and is ready for pouring out into plates. The adjusting of reaction is the most important point in its preparation. If more acid is added specific inhibitory action on *B. coli* is annulled; and if medium is made more alkaline growth of *B. typhosus* is retarded. Many strains of *B. coli* completely fail to grow on this medium; others grow slowly and others quite readily.” [cf. TIDY & DUNN (Brilliant Green) this *Bulletin*, Vol. 9, p. 19; DIENERT & MATHIEU (Malachite Green), p. 471.]

J. H. T. W.

KISCH (Bruno). **Einige neue Differentialnährböden von Bacterium paratyphi A und B.** [New Media for Separating Paratyphoid A and B.]—*Wien. Klin. Woch.* 1918. May 23. Vol. 31. No. 21. pp. 585-586.

Before describing his own methods Dr. Kisch reviews the media used by LEHMANN and BRELING. The latter uses a xylose-litmus-agar culture medium in which *B. paratyphosus* B breaks up the xylose with formation of gas and reddening of the litmus; *B. paratyphosus* A shows no such reaction in this medium. The author's culture media are based on his observations that *B. paratyphosus* B can obtain nitrogen from media formed of glucose agar with certain ammonium salts, while such media are of no value to *B. paratyphosus* A as a source of nitrogen. The salts used were ammonium sulphate, ammonium phosphate and ammonium tartrate, the last being the most satisfactory as a supplier of nitrogen to the “B” bacillus. Thus with the help of ammonium-glucose-agar, when it is only necessary to distinguish between A and B, the diagnosis can be made with certainty, not rendering other differential media unnecessary but as a method of confirmation. Parallel cultures are made upon a plate of ammonium-glucose-agar. With a grease pencil the plate is divided into four sections. On one section is implanted the suspected bacillus; on the other three well known strains of *B. typhosus*, *B. paratyphosus* A and *B. paratyphosus* B are planted. The plate is put into the incubator and is examined after each period of 24 hours, for three days. *B. typhosus* appears on the second or third day, rarely at the end of the first 24 hours, in scattered, isolated, but generally well grown colonies. *B. paratyphosus* B shows plentiful growth of colonies after 24 hours; while *B. paratyphosus* A only appears if at all, after 72 hours, on this culture medium.

J. H. T. W.

KABESHIMA (Tamezo). Importance des proportions de sang pour l'hémoculture dans les fièvres typhoïdes et paratyphoïdes.—*C. R. Soc. Biol.* 1918. Apr. 27. Vol. 81. No. 8. pp. 420–422.

It is reasonable to suppose that where the infecting bacilli are present in small number in the blood of a patient they might escape detection if only a small sample of blood is taken. The author found that 5 cc. of blood, taken from a suspected case of typhoid fever, when divided into equal parts showed the presence of *B. typhosus* in one tube while the other remained sterile. He then began the series of experiments shown in Table 2. Positive results were obtained with 15 cc. or 20 cc. of blood in cases where 5 cc. samples gave only negative results.

It is interesting to note that where 5 cc. gave positive results the experiment was made early in the disease: on the 2nd day and the 4th day, No. 4. It is equally interesting to notice that two cases, (Nos. 7 and 10), which had failed to give positive results during the first week, when the temperature was high, with 3 to 5 cc. of blood, gave positive results on the 10th and 12th days from 20 cc. and 18 cc. of blood.

As the result of these investigations the author writes:

"In order to diagnose typhoid fever rapidly and with certainty, especially where the temperature is not very high, I believe it necessary to carry out blood-culture with a larger quantity of blood (15 to 20 cc.) than is generally used, not remaining content with an amount relatively large (3 to 5 cc.) but insufficient, I repeat, for the purpose of obtaining a positive result."

J. H. T. W.

JOHNS (Foster M.). The Bass-Watkins Agglutination Test for Typhoid.—*New Orleans Med. & Surg. Jl.* 1918. July. Vol. 71. No. 1. pp. 22–26.

This method was instituted by BASS and WATKINS eight years ago (*Archives of Internal Medicine*, Sept. 1910) and is grounded upon the observation that, within certain wide limits, "the more concentrated the suspension of bacteria, the more rapidly agglutination takes place in the presence of a given amount of agglutinin." The time factor is reduced and with heavy suspensions of bacteria the reaction is rendered easily visible to the naked eye. With the co-operation of Dr. Bass the author has "been able to evolve a formula that has answered every requirement";

"The technic is designed to meet the exact requirements of the classical Widal in a serum dilution of 1 to 100, with the exception that the organisms are definitely spaced to where they are immediately sensitive to the collective forces of surface tension, when these are initiated by the addition of the agglutinating serum instead of depending on the many varied factors of motility, reaction, strain and concentration of the broth culture in the classical test."

The stock suspension of dead typhoid bacilli contains 10,000 million bacilli per cc. in 1·7 per cent. salt solution, with 1 per cent. formalin.

"In making the reaction we add one drop of water to a smear consisting of one-quarter drop of blood; dissolve the blood by stirring with a match or toothpick. Add one drop of Bass-Watkins suspension and then

KABESHIMA (Tamezo).]

Nos.	Noms.	Age.	Maladies.	Date du prélevement du sang.	Quantité de sang ajoutée à la bile (15 c.c.).	Développement ou n° de l'agent pathogène.	Etat de la maladie au moment de prélevement du sang :		
							Jour	Temp.	Pouls
1	Nomur	24	Para-B.	1915. 21 déc.	c.c. 5-0	—	5e	38-0°	85
2	Kamid	25	Typhoïde	30 déc.	15-0 4-0 20-0	— — —	9e	38-0°	85
3	Saka	25	"	1916. 8 janvier	3-5 15-0	— —	4e	38-3°	90
4	Kanek	22	"	10 janvier	5-0 20-0	— —	2e	38-7°	100
				12 janvier	5-0 20-0	— —	4e	38-5°	90
				15 janvier	5-0 15-0	— —	7e	37-3°	90
5	Takag	23	"	10 janvier	5-0 15-0	— —	6e	36-4°	69
6	Jam	37	"	27 janvier	5-0 15-0	— —	7e	36-0°	70
7	Koba	24	"	6 janvier 27 janvier 30 janvier	3-0 3-0 5-0 20-0	— — — —	4e 7e 10e	38-6° 37-8° 36-5°	90 86 50
8	Kond	23	"	10 février	5-0 15-0	— —	10e	38-2°	72
9	Takat	21	"	10 février	5-0 15-0	— —	7e	36-9°	50
10	Hara	20	"	16 février 19 février 21 février	5-0 5-0 3-0 18-1	— — — —	7e 8e 12e	38-3° 38-3° 37-1°	66 66 65

Examples of Cases in which the typhoid bacillus was demonstrated in culture by means of large samples of blood.

gently agitate the slide for one minute, watching for the appearance of a meal-like sediment of agglutinated organisms in the positive reaction. In the case of a negative reaction the suspension on the slide remains uniformly turbid."

A negative control experiment should be always made. The suspension when made up should be practically neutral.

J. H. T. W.

MACADAM (Wm.). *The Late Appearance of Agglutinins in Paratyphoid A Fever.*—*Jl. Roy. Army Med. Corps.* 1918. Aug. & Sept. Vol. 31. Nos. 2 & 3. pp. 140-152; 208-216. With 7 charts.

The chief conclusions drawn from the interesting and detailed investigations recorded in this "paper" are

"based on a series of thirty-three acute cases, mostly paratyphoid A fevers, from fourteen of which the infective organism has been isolated either by means of blood culture or from the faeces. The agglutination reactions [Dreyer's macroscopic method] have been carried out at intervals from the first to the twentieth week dating from the commencement of the fever, while in every instance the agglutinin titre has been worked out to its end-point.

"(2) The agglutinins for *B. paratyphosus* A are in a proportion of cases of paratyphoid A fever very late in their appearance."

The highest was never recorded before the fourth week; in twenty-two cases the maximum did not appear before the sixth week.

"(3) Although the presence of para A agglutinins may occasionally be revealed . . . in low dilutions of the sera, yet this is by no means constant, for those agglutinins appear to be sometimes altogether absent until a comparatively late period of convalescence when they may be found present in large amount. It would appear as if the reason why the maximum agglutination titre for para A has always been considered to be relatively low, is that its estimation has not been followed into convalescence.

"(4) A certain proportion of potential paratyphoid carriers may thus be missed. . . .

"(5) In two-thirds of the present cases in which agglutination tests have been carried out during the first and second weeks of the pyrexia, a marked diminution and occasional disappearance of the inoculation agglutinins has been found to occur. In cases of malaria and other acute non-enteric febrile conditions no such diminution of the agglutinins resulting from previous T.V. or T.A.B. inoculation has been detected when compared with the agglutination reactions obtained during the afebrile state.

"A marked ascent in the *B. typhosus* agglutination curve usually precedes or is synchronous with the appearance or increased production of para A agglutinins. This group reaction for *B. typhosus* has been a remarkably constant feature in both the T.V. and T.A.B. series of cases.

"No relation is to be detected either between the occurrence of relapses and an alteration in the agglutination curve or between the end of the pyrexia and the date of record of the maximum agglutinin content.

"The increase in *B. typhosus* agglutinins which seems invariably to precede the ascent in the para A curve, coupled with the frequent late appearance of para A agglutinins, shows the futility of basing any statistics on the relative incidence of typhoid and paratyphoid fevers diagnosed from single and casual agglutination tests carried out during either pyrexia or early convalescence in cases where blood cultures have either proved negative or been neglected. . . .

"These observations suggest that in suspected cases of fever of the 'enterica' group in subjects inoculated with T.A.B. vaccine, the value of the agglutination reaction as an aid to the rapid and accurate diagnosis

of the specific infective organism is for practical purposes nil. If, however, it be possible to plot out the agglutination curve obtained by the performance of a series of tests repeated at short and regular intervals and continued well into convalescence the scientific interest of the reaction may be considerable in the study of the inter-relationship of inoculation and infection agglutinins, and of the processes on which the agglutination phenomenon depends."

[Cf. GARROW, *Bulletin*, Vol. 11, pp. 446-449; also BONEY, CROSSMAN & BOULENGER, see above, p. 387 with which other references are given.]

J. H. T. W.

PERRY (H. Marrian). *Illustrations of the Agglutination Method of Diagnosis in Triple Inoculated Individuals.* (With a note by SIR WILLIAM LEISHMAN.)—*Lancet*. 1918. Apr. 27. pp. 593-601. With 10 figs. & 9 charts.

Sir William LEISHMAN writes:—"Doubts have from time to time been expressed as to the diagnostic value of agglutination tests in fevers of the typhoid group contracted in men who had been inoculated with "T.A.B." vaccine. These doubts have frequently had special reference to the employment of Professor Dreyer's agglutination technique and of his standard emulsions . . . almost exclusively used in the B.E.F. in France."

To test these doubts Sir William LEISHMAN "asked Captain PERRY, whose experience of this method is exceptionally wide, to undertake" a description of a series of his cases.

As the result of careful collection of data given in "tables" and charts Captain Perry's opinions are summarised as follows:—

"1. *Positive results.*—Presuming that the technique is carried out by a skilled and careful worker, a change in titre of 100 or 200 per cent., manifesting itself in a regular curve and reaching its maximum between the sixteenth to the twenty-fourth day (in exceptional cases as late as the thirtieth day) justifies a diagnosis of active enteric infection.

"In many cases it is possible to determine exactly which organism is responsible for the infection, because the rise in titre for one organism is so markedly accentuated. Cases of enteric infection are, however, met with in which a rise or fall in titre for all three organisms occurs synchronously and equally. . . .

"2. *Negative results.*—Cases which are clinically classified as belonging to the enteric group at present occur in which not only do repeated bacteriological examinations fail to isolate an organism, but in which agglutination readings are so absolutely level or exhibit such slight variation that they afford no help in confirming the clinical diagnosis."

This failure may be due to:—

"(a) Possibly, but not necessarily as a result of inoculation, the character of the infection may be so mild that agglutinins are produced to such a slight extent as to cause a variation in titre which is not diagnostic." [An example is given of a mild typhoid infection in a non-inoculated subject showing only slight immunity response:—1 in 12.5 on the 14th day and 1 in 295 during a relapse, on the 32nd day.]

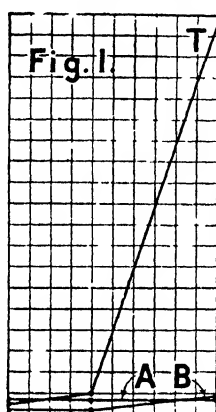
"(b) The organism responsible for the infection may be a feeble producer of agglutinins. This particularly applies to paratyphoid A infections. It is now well known that in a non-inoculated or typhoid-inoculated subject a diagnosis of paratyphoid A fever is justifiable when an agglutination for this organism is evident in a dilution as low as 1 in 10. The organism has been repeatedly isolated in this laboratory in cases which have never given higher readings. The production of so feeble an agglutinin response makes it evident that in triple inoculated subjects

the change in titre of inoculation agglutinins for *B. paratyphosus* A must, in a certain proportion of cases, be so slight as to render diagnosis uncertain or impossible.

"(c) The fact that many of these cases have, in addition to receiving a typhoid vaccine, also been inoculated with four doses of T.A.B. vaccine, may in some way influence agglutinin production."

As examples of diagnostic agglutinin in subjects inoculated with "T.A.B." vaccine three "curve" figures are given.

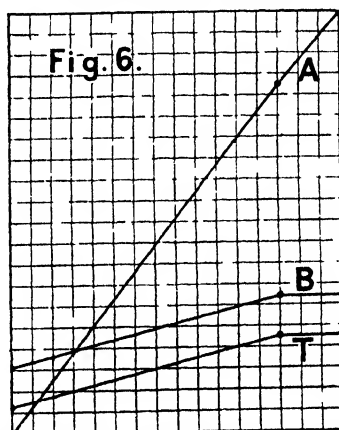
1. Typhoid fever.



"T.A.B." inoculation April 1916, *B. typhosus* from faeces. Illness October 1916.

	T.	A.	B.	
Day of Disease { 8	10	19	9	} Agglutinin Units.
12	25	19	6	
18	465	20	23	

2. Paratyphoid A fever.

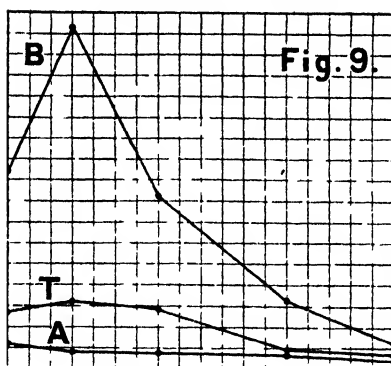


"T.A.B." January 1916. Bacillus isolated from faeces. Illness August 1916.

	T.	A.	B.	
Day of Disease { 5	32.5	0	64	} Agglutinin Units.
18	92.5	330	129	
21	92.5	410	129	

[Figs. 1 and 6 reproduced by permission from *The Lancet*.]

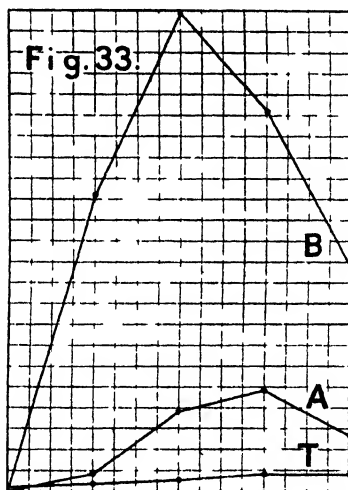
3. Paratyphoid B fever.



"T.A.B." February 1916. Illness April 1916. Bacillus twice obtained from faeces.

		T.	A.	B.	
Day of Disease	11	263	104	921	Agglutinin Units.
	14	306	75	1628	
	18	285	75	814	
	24	82	48	328	
	29	57	44	114	

Fig. 33 is of interest as showing paratyphoid B infection coincident with inoculation.



The agglutination graph represented above illustrates a paratyphoid B infection coincident with inoculation. The patient was feeling ill the day before he received 1 cc. of T.A.B. vaccine. The case ran a typical course and *B. paratyphosus* B was repeatedly isolated from the faeces. The marked accentuation in rise of the paratyphoid B agglutinins is evident, the maximum being reached about the nineteenth day.

[Cf. GLYNN & LOWE; this *Bulletin*, Vol. 9, pp. 15-16.]

[Figs. 9 and 33 reproduced by permission from *The Lancet*.]

J. H. T. W.

FENNEL (Eric A.). **Agglutinin Response after Army Triple Typhoid [T. A. B.] Vaccination.**—*Jl. Amer. Med. Assoc.* 1918. June 22. Vol. 70. No. 25. pp. 1915–1919. With 10 charts.

"The method of administering bacterial vaccines. . . . at the time these studies were begun was :—The first dose consisted of 500 million typhoid. The second dose, on the fourth day. . . . of 375 million paratyphoid A plus an equal number of paratyphoid B." Four days later 1,000 million typhoid were given and again four days later 750 million of "A" and of "B" were given. After another period of four days the final typhoid dose of 1,000 million was given and four days later the final paratyphoid A and B doses of 750 million were given.

The agglutinin was estimated by the "Standard Oxford Method."

Conclusions.

"1. Definite agglutinins for all three organisms are developed after the use of Army vaccine. They are equal after alternating doses and [after] triple vaccine, the methods are equally effective, and the time saving element in the latter is obvious.

"2. Previous vaccination has the effect of repressing agglutinins for the specific organism. [Cf. BAKER, this *Bulletin*, Vol. 9, p. 463.]

"3. Fluctuations in agglutinin content occur after vaccination, in normal cases, and are of little diagnostic value in cases of fever.

"4. There is no relation between the systemic and the local reaction, after vaccination, and the units of agglutinins produced."

J. H. T. W.

DAVISON (Wilburt C.). **The Superiority of Inoculations with Mixed Triple Vaccine (*B. typhosus*, *B. paratyphosus* A, and *B. paratyphosus* B) over Successive Inoculations with the Single Vaccines, as shown by Agglutinin Curves in Men and Rabbits.**—*Arch. Intern. Med.* 1918. Apr. 15. Vol. 21. No. 4. pp. 437–509. With 23 curves.

Of this long paper, the "Alvarenga Prize Essay" for 1917, only the conclusions need be given :—

"From the foregoing discussion of the results obtained in these experiments the following conclusions bearing on the practical problem of prophylactic inoculation in man against the typhoid-paratyphoid group of organisms stand out as possessing paramount importance :

"1. When a mixed vaccine is used the immunity obtained for each of its constituent bacilli is at least as good as, and very often greater than, that obtained against any one of these organisms when it is employed alone in the same dosage for a first immunization.

"2. When single vaccines are employed in succession and the immunizations are carried out independently, the response is greatest to that vaccine which is introduced first. To the later immunizations with other micro-organisms the specific response is almost always less intense. It has associated with it, however, as a secondary result the production of a new rise of variable extent in the agglutinin titer of the serum of the bacillus of the first immunization."

J. H. T. W.

BESREDKA (A.) & BASSECHES (S.). **Des virus sensibilisés. Vaccination antiparatyphique B.**—*Ann. Inst. Pasteur.* 1918. May. Vol. 32. No. 5. pp. 193–201.

Sensitized vaccines first suggested by Prof. Besredka in 1902 are still, in his opinion, superior to all others in safety, certainty of effect

sterilized bacilli are suspended in an oily (lipoid) medium. 1 cc. contains 2 mgm. of *B. typhosus*, and 1.75 mgm. of each of the paratyphoid bacilli.

The author of the "Request" claims that "the immunizing substances" in a lipoid medium are absorbed more slowly than is the case with other vaccines, and that a sufficient amount of such substances can be introduced in one dose, "giving a complete immunization and thus reducing the frequency and importance of local and general reactions" [cf. WIDAL and SALIMBENI: *Bulletin*, Vol. 9, p. 469; Vol. 10, p. 296].

J. H. T. W.

KOSUGI (B.). [Typhoid and Paratyphoid Agglutination by the Serum from a Vesicle in T. B. Patients.]—*Jikwa Zasshi (Jl. of Pediatrics)*. 1917. Sept. 20. No. 208. pp. 1-39.

[From Review by R. G. MILLS.]

All cases were excluded that had previously suffered from either one of these diseases. About 10 per cent. of the remainder gave positive tests even in dilutions as high as 1-100. The strength of the test had no evident relation to the severity of the T.B. infection.

J. H. T. W.

KO (R.). [The Action of Fruit Juices upon the Typhoid Bacillus.]—*Taiwan Igakukai Zasshi (Jl. Formosa Med. Soc.)*. 1917. Sept. 28. No. 179. pp. 569-580.

[From Review by R. G. MILLS.]

In the Orient where fruit is exposed for sale under most insanitary conditions after having been handled by any number of hands, probably none too clean, and often eaten raw on the street corner or just as purchased, a study like this is very timely.

Most fruit juices which are acid have a bactericidal action upon any typhoid bacilli that might gain entrance through the broken skin but naturally would not be able to overcome any outside contamination. Half ripe fruit is usually more powerful in its sterilizing power than that which is fully ripe, the substitution of acid for sugar being the important change. Tannic acid is the strongest of the vegetable acids, followed by citric and tartaric and finally malic. Sugars and starches have no antiseptic action no matter how strong, rather encouraging than interfering with the vitality of the organism.

Solutions of acids for drinking purposes have considerable sterilizing power, the efficacy of these "lemonades" varying from that containing HCl, which is the strongest, through tartaric and sulphuric acid to citric acid which is the weakest.

The list of those whose juices do not kill the typhoid bacillus includes, *Nephelium longanum* (longan fruit), *Citrus nobilis* (navel oranges), *Eryobotrya japonica* (Biwa), *Mangifera indica* (mango), *Citrullus vulgaris* (water melon), *Eigen Cariae*, *Pyrus sinensis* (pear), etc.

Those whose juices do not favour the viability of the typhoid are, *Ananas sativa*, *Pisidium gayava*, *Eugenia javanica*, *Diospyros Kaki* (persimmon), *Musa sapientum*, *Nephelium Litchii* (lychee nut), *Vitis vinifera* (grape), *Prunus persica* (peach), *Prunus communis*, *Citrus decumana*, *Myrica rubra*, *Averrhoa carambola*. [v. VEIGA: *Bull.* Vol. 9, p. 474.]

J. H. T. W.

BONNE (C.). Opmerkingen over een merkwaardige typhus-infectie.—*Geneesk. Tijdschr. v. Nederl.-Indië*, 1918. Vol. 58. No. 3. pp. 327–334. With 1 chart.

Describes a serious case of typhoid fever in a Creole woman, aged 30. The attack followed the birth of a child. The illness lasted from April to June 6th, 1917, when the patient died. Blood culture had given a negative result. Spleen and liver were enlarged and there was marked jaundice. Small abscesses were found in the liver and gall stone in the gall bladder. Pure culture of *B. typhosus* was obtained from the pus of the abscesses in the liver.

J. H. T. W.

PLAGUE.

BROWNLEE (John). *Certain Aspects of the Theory of Epidemiology in Special Relation to Plague.*—*Proc. Roy. Soc. Med.* (Sect. Epidem. & State Med.). 1918. May. Vol. 11. No. 7. pp. 85–132.

The conclusions arrived at in this communication are mainly based on the series of ten reports issued by the Advisory Committee for Plague investigations in India.

With regard to the problem of the cessation of epizootic plague in rats three theories are possible: Firstly that it dies out from lack of sufficient numbers of susceptible rats, secondly that the infectivity of the plague organism decreases and thirdly that some disadvantageous circumstance, such as unfavourable weather conditions, so far reduces the number of fleas as to determine the end of the epidemic. As the epidemic in man has a maximum about seventeen days later than the epizootic in rats and the epidemic in man is admittedly spread by fleas that are derived from the rat, the third theory presents considerable difficulties. The theory that the epizootic dies out from want of a sufficient number of susceptible rats can be shown to be statistically incompatible with the facts, while on the other hand the theory of the loss of infectivity on the part of the infecting organism readily explains the whole facts. This theory furnishes an explanation of the symmetry and also of the near synchronism of the two epizootics, while the difference in the number of fleas provides a basis for expecting that the concentration factor should be different in the epizootics of the brown and the black rat.

In connection with the well known periodicity of plague epidemics it does not hitherto appear to have been regarded as possible that the change in the season of the epidemic might be possibly due to some property in the life-history of the organism. One of the first things that strikes the observer with regard to the Bombay epidemics is that from the commencement of the epidemics in 1896 to the present day the date of the mean of the epidemics, though oscillating backwards and forwards, has been steadily becoming later and later in the year, although the difference in date of the mean during the seventeen years observed is little more than fifty days.

This periodicity is not necessarily more than a year, but may be less, as with the epizootics in rats in the town of Sydney, in which the epizootic tended to occur earlier and earlier every year. There is another phenomenon of great importance which may be called pseudo-periodicity. In this case an epidemic becomes later and later in the year until a point is reached at which the possibility of plague breaking out becomes almost zero. At this epoch a throwback may occur and a second succession of epidemics follows, only to arrive at a similar impasse. The epidemics of plague in Alexandria, following the year 1835, are cited as examples, though many such occur in the plague statistics of India.

Weather conditions in relation to plague have always been considered of great importance; temperature, relative humidity and saturation deficiency being all considered as factors in the incidence and fall of epidemics. After examining this side of the question the conclusion

is arrived at that the requisite data do not exist to establish any but the roughest association between outbreaks of plague and weather conditions. To determine fine associations will require not merely more data but also mathematical treatment on lines not hitherto suggested.

R. St. J. Brooks.

CADET & GAIDE. **Au sujet de la Peste du Sud-Annam. I. Rapport sur l'épidémie de peste du Sud-Annam pendant l'année 1915.** [CADET.] **II. Considérations générales sur les résultats obtenus et sur les mesures complémentaires à prendre.** [GAIDE.]—*Bull. Soc. Méd.-Chirurg. Indochine*. 1917. Oct. Vol. 7. No. 8. pp. 270-288.

Since the year 1908 plague has been endemic in South Annam, but the present investigation deals only with the course of the disease in the year 1915. In all, 281 cases occurred in the three provinces of Phanthiet, Phanri and Phanrang. The height of the epidemic was reached in the month of May when 51 cases occurred.

139,983 injections of Haffkine's prophylactic were given on the principal of a first dose of 1 cc. followed by a second dose of 2 cc. twelve days later. As to results, the only definite conclusion arrived at was with respect to a series of cases in Phanri. Of 22 fully vaccinated cases, 12 died of plague, giving a mortality of 57 per cent., while of 27 non-vaccinated controls, 26 died of plague, giving a mortality of 96 per cent.

With regard to the rat population the brown rat (*Mus Norvegicus*) apparently constituted the gravest danger on account of its high flea infestation, giving a mean flea population per rat of 24 in the month of May (when the epidemic reached its height). The flea infestation of the house rat (*Mus rattus*) was relatively slight and did not display any marked seasonal variation.

R. St. J. B.

STANLEY (Arthur). **Pneumonic Plague in China.**—*National Med. Jl. of China*. 1918. June. Vol. 4. No. 2. pp. 42-44. *China Med. Jl.* 1918. May. Vol. 32. No. 3. pp. 207-209.

The expiring epidemic of pneumonic plague in Shansi and the contiguous provinces appeared towards the end of 1917 in the neighbourhood of Patsebolong in South Mongolia, in the vicinity of the Yellow River. It entered the province of Shansi in December of that year, reaching the railroad of the Pekin-Kalgan Railway in January and spread down the mountain passes almost to the gates of Taiyuan in mid Shansi. Although infection reached the Pekin-Hankow Railway last February, the important town of Hankow itself escaped infection. Remarkable long distance "sprints," however, brought infection down the Tientsin-Pukow line to Fengyang, Tsinan and Nanking. The return of spring-like weather helped to prevent the further spread of the malady in the populous and overcrowded centres in the lower part of the Yangtse Valley.

The epidemic proved of smaller dimensions than the Manchurian outbreak of 1910-11, probably because the area of origin was not so closely in touch with railway communications and because measures

restricting the movement of carriers of infection by railway, &c., were earlier put into operation. The Shansi epidemic, moreover, originated or gathered momentum a month later than the Manchurian outbreak. The source of infection in the Manchurian was almost certainly the Tarbagan Marmot (*Arctomys bobac*), which apparently acts as a reservoir of plague infection in Manchuria.

"The vast sandy wastes beyond the northern border of China may be considered for practical purposes a potential endemic plague-infected area, where plague-infection is ever present somewhere or other among certain rodents, leading to a danger of human infection when least expected. Hitherto stress has been laid on the tropical home of plague, mainly bubonic; but the menace of the North is more sinister, threatening, and elusive. Pneumonic Plague, the most deadly of all diseases, exceeds the bubonic form in intensity of virulence and capacity for rapidly destroying man."

R. St. J. B.

NYASALAND. Reports on Outbreak of Bubonic Plague in the North Nyasa District, Nyasaland. [A. KINGHORN & E. J. QUIRK.]—
MS. Reports to Colonial Office dated Jan. 14 & Oct. 21, 1917.

The earliest cases of plague in the North Nyasa district appear to have occurred as far back as November 1916, but it was not until January 1917 that official attention was called to the matter. At an early date the investigation was put into the hands of Surgeon Major KINGHORN who reported the result of his enquiries on the 24th April 1917. A further report was made on 21st Oct. 1917 by Dr. E. J. QUIRK, who took up the work after Major KINGHORN's departure. The original source of the disease appeared to be in the territory formerly known as German East Africa, and the infection was probably brought south during the military operations of 1916. A plague epizootic commenced among the rat population early in November 1916 and reached its height in December of that year. By the commencement of January rats had almost disappeared from most of the infected villages. The human epidemic commenced towards the end of November, increased in severity during December and January and afterwards tailed off, the cases being few in number and of a mild type without mortality. The disease was confined to a small area in the immediate vicinity of Karonga near the shores of Lake Nyasa. Between the 27th December and the 14th March, 33 cases of plague occurred with 19 deaths, a percentage mortality of about 56. All the cases appeared to be of the bubonic type and did not present any features of particular interest.

Prompt and drastic measures were taken to deal with the local situation and to limit the spread of infection. A recrudescence of the disease occurred in September 1917, but this was promptly dealt with, principally owing to the measures which had been taken to deal with the rat population during the year. During 1917 it was estimated that a million and a half rats had been disposed of in the district [a very creditable performance]. Haffkine inoculations and other methods of prophylaxis were carried out as far as circumstances permitted.

R. St. J. B.

ROUSSEAU (Paul). *Sur la peste du Sénégal (1914).*—*Paris Méd.* 1917. Dec. 1. Vol. 7. No. 48. pp. i-v. With 7 figs.

Observations are here given on six cases of pneumonic and septicaemic plague which occurred at N'Diourbel, Senegal, in the summer of 1914. A peculiarity of several of the cases was that although the pulse was very rapid, the patients did not exhibit any rise of temperature during the illness, which in all cases terminated fatally.

Haffkinization, during the incubation period, appeared to aggravate the symptoms, but good results were obtained by prophylactic inoculation. The acquired immunity seemed to be operative for a period of about four months. It is stated that the white population enjoyed almost complete immunity from the outbreak [but the statement that some of the white contacts were found to have agglutinated plague bacilli in the sputum, while showing no evidence of disease, is somewhat difficult to evaluate].

R. St. J. B.

KITANO (T.) & SUKEGAWA (K.). *On Sensitised Plague Vaccine and its Practical Application.*—*Kitasato Arch. Experim. Med.* 1918. May. Vol. 2. No. 1. pp. 67-86.

In order to avoid, if possible, the severe reaction often incident to the use of prophylactic plague vaccine, a sensitised vaccine was employed by the authors in their recent experimental work. Plague bacilli were grown for 48 hours at 32° C., and to every gram weight of the culture 40 cc. of physiological salt solution and 10 cc. of plague immune rabbit serum were added. After shaking for 30 minutes in a shaking apparatus, the suspension was incubated and shaken occasionally. After two hours incubation at 37° C., which was considered long enough to allow the sensitization of the virus to take place, the mixture was centrifuged at 3,000 revolutions per minute. The supernatant fluid was removed and the bacillary mass washed with saline. The bacilli thus washed were ready for making the vaccine suspension, which consists of 2 mgm. of the bacilli in one cc. of saline containing 0.5 per cent. carbolic acid.

Comparative inoculations of rabbits with sensitized vaccine and unsensitized heated vaccine, showed that, by the subcutaneous method, antibody was produced in each case by the 9th day sufficient to protect the animal against double the lethal dose of the living bacillus. With both heated and sensitized plague vaccine, the intravenous route seemed to produce agglutinin and antibody earlier than the subcutaneous; with sensitized vaccine on the 7th day, with heated vaccine on the 9th day. When a second inoculation of 4mgm. of vaccine was given, antibody was found to be present on the 6th and 7th days respectively, the titres of the sera reaching their maxima on the 14th day.

In the human subject the double inoculation system gave a better development of antibody and agglutinin than a single inoculation. After two inoculations of 6 mgm., the blood serum contained enough efficacy to protect the experimental animals from death with 0.2 cc. of the serum, while sometimes 0.05 cc. was sufficient. The serum

of a man who had received only one inoculation of 2 mgm. of the bacilli, however, had only the power to prolong the animal's life. The sensitized plague vaccine did not produce any local or general reaction in the inoculated person.

R. St. J. B.

McGiffin (R. H.). Anti-Plague Vaccine : Its Effects on the Normal Individual.—*Jl. Roy. Nav. Med. Serv.* 1918. Apr. Vol. 4. No. 2. p. 212.

A case of plague having developed on board ship, eighty-three contacts and volunteers were inoculated [the nature and source of the vaccine employed is not indicated]. Seventy-five were given full doses, i.e., 4 cc. ; eight (the reaction from 4 cc. proving so severe) were given 2 cc.

An immediate reaction after injection occurred in every case, causing numbness or aching at site of inoculation, spreading over the whole arm and gradually increasing in intensity for three hours, with considerable swelling and inflammation at site. A general reaction then set in, temperature ranging from 100° to 103° F. with restlessness, headache, malaise, vomiting in many cases, and very severe joint pains. The conditions lasted for about thirty-six hours when the general symptoms cleared. Two cases showed acute depression and in several the olecranon bursa became acutely inflamed. In about 20 per cent. of the cases there was a recurrence of local pain and swelling on the fourth to fifth day, which, however, quickly subsided.

R. St. J. B.

i. **DENNYS (G. W. P.). Rat Destruction as a Means for the Prevention of Plague.**—*Indian Med. Gaz.* 1918. Jan. & May. Vol. 53. Nos. 1 & 5. pp. 1-5 : 164-168.

ii. **WHITE (F. Norman). Plague and Rat Destruction.**—*Ibid.* Aug. No. 8. pp. 281-288.

i. In support of his contention that the destruction of rats, even on an extensive scale, is useless as a measure for the prevention of plague in Indian towns, the author gives an analysis showing the number of plague deaths, the date of commencement and ending of each epidemic, the measures taken, the number of rats known to have been destroyed, the dates on which the rat campaigns were commenced and ended, in each of the municipal towns and in two of the cantonments of the Central Provinces during the period of seven years, 1910 to 1916. From a study of these statistics it would appear that for some reason yet to be explained, certain towns in the Central Provinces (e.g., Dhamtari and Drug) seem to have been proof against plague during the seven years under consideration. At the former no rats were destroyed while at the latter they were systematically killed, but on a small scale. Three towns—Khamgaon, Shegaon and Malkapur—were severely visited by plague during the period in spite of thorough and systematic rat destruction,

while the town of Buldana which was in the same part of the province almost escaped infection. The three former towns were on the railway, while Buldana was not.

Not only does rat destruction appear to the author to be useless as a means for the prevention of plague, but in several of the towns analysed there was strong reason for thinking that the attempt to reduce the normal rat population of a town has tended to increase the chances of that town becoming plague-infected. Investigation also tends to show that towns previously plague-infected at which no rat destruction was attempted are not more prone to a recrudescence of the disease than those in which vigorous and systematic rat campaigns were conducted.

ii. This paper is a criticism of Col. DENNYS'. A sample is given of the data on which Col. DENNYS bases his arguments, and it is pointed out that every single one of the statements is incorrect in the context in which it is placed and the vast majority of them are absolutely and fundamentally wrong. The problem of the rat flea cannot be considered apart from that of its host, and all who have given any time to the study of *Xenopsylla cheopis* will appreciate the fact that the only practical way of dealing effectively with the parasite is by attacks on the rat, its definitive host, a proceeding that Col. DENNYS stigmatizes as useless and dangerous! Such startling conclusions, which are at variance with the well-found opinion of many, have unfortunately had the effect of seriously hampering the prosecution of anti-plague measures in various parts of India.

Whilst admitting that indiscriminate rat destruction, as it is too often carried out, effects very little good, rat destruction will always remain a valuable anti-plague measure. The failures mentioned in Col. DENNYS' second communication only mean that the methods employed were ineffectual, not that rat destruction in itself is a harmful measure. The information given is not nearly sufficient to enable the reader to draw any such conclusions.

In conclusion it is frankly acknowledged "that the complete eradication of the rat by means of rat destruction is impossible in any Indian town, but that does not mean that rat destruction energetically carried out in the non-epidemic season cannot diminish or eradicate altogether foci of plague infection; in most parts of India such foci are not numerous in favourable years; *it does not mean that rat destruction cannot diminish the risks of plague and diminish mortality. It can do both.*"

R. St. J. B.

MOORE (A. E.). **Destruction of Rats as a Means for the Prevention of Plague.** [Correspondence.]—*Indian Med. Gaz.* 1918. Mar. Vol. 53. No. 3. pp. 114–115.

The author confesses to a feeling of utter hopelessness with regard to the coping with plague by the methods at present in vogue. The difficulties in connection with deratization are due to prejudice and to unsatisfactory work of the plague gangs.

The association of the rat with the Hindu god Ganesha tends to preserve this animal from destruction and rats caught in traps set in houses are frequently liberated in the streets. "Rats will never be killed with the help of Hindus."

In place of the expensive organisation which has grown up to combat plague the following suggestions are made:—

"1. There are many powders on the market which are cheap and effective insecticides. If none of these is considered satisfactory, investigation might be undertaken to produce a cheap and effective powder for killing fleas, which would not be harmful to man or beast.

"2. This powder should be manufactured wholesale and distributed to every Tehsil.

"3. During an epidemic the zaildars and lumbaridars should distribute this powder to every household.

"4. The women should be instructed in the villages to mix the powder with *lipai*, and *lipai* their floors and walls with it, and also sprinkle the floor and their clothing.

"5. If practicable, and the powder retains its potency, it could be made into a solution and floors and walls washed with it.

"6. The people could be assured of its harmless nature and also of its efficacy. The ordinary precautions of sunning clothes and utensils would also of course be carried out including inoculations.

"7. If the people could also be persuaded to wear some protection for their legs, disinfected by this powder, much might be achieved."

R. St. J. B.

GOKHALE (Annaji V.). **Rat-Killing Operations in Mahableshwar.**—*Indian Med. Gaz.* 1918. Aug. Vol. 53. No. 8. pp. 288-289.

In this investigation various types of rat traps were used and the comparative results obtained are shown in the following table:—

Kind of trap.	Number of traps set.	Number of rats caught.	Number of rats caught per 100 traps.
Break-Back ..	19,345	1,806	9.3
Rawalpindi. . .	1,548	111	7.2
Calcutta Wonder	449	1	0.2
Wonder, of the Army and Navy Society	22,864	3,124	13.7
Total	44,206	5,042	11.4

From the above table it will be seen that the "Wonder" traps of the Army and Navy Society gave greater satisfaction than the other varieties of traps.

The "Break-Back" trap has the disadvantage of also killing the musk-rat, "the natural enemy of the rat"—and of being dangerous to children who happen to handle it. Moreover, if used continuously, it soon fails to deceive the rats. No trap of a single pattern will continue to catch rats for a long time, and so different traps with varying shapes should be employed.

Sixteen cases of plague occurred in Mahableshwar this year, of which only two occurred in the trapped area and the remaining fourteen in the untrapped area. The opinion is expressed that the "white-bellied jungle rats" [*Mus Alexandrinus*] form a powerful medium for spreading plague infection, as they cannot be controlled when once the infection is introduced amongst them.

R. St. J. B.

BONAIN. Dératisation et Désinsection des locaux de petites dimensions.

—*Arch. Méd. et Pharm. Nav.* 1918. Mar. Vol. 105. No. 3. pp. 215-223. With 1 fig.

While admitting the superiority of the "Clayton" and other apparatus for the disinfection of ships and large buildings, the use of liquid sulphurous anhydride is here recommended for fumigation of small spaces. The best method of application is by means of a device called a "Sulfogène"—a metal cylinder provided with a screw tap and removable union connected with a tube which passes into the space to be fumigated. The dimensions of the apparatus are 70 mm. internal diameter by 300 mm. in height. After allowing 1/5 volume for expansion, the cylinder ought to contain 1,290 grams of sulphurous anhydride. With this quantity of gas a locality of 18 cubic metres area (which represents the average size of a ship's cabin) can be adequately disinfected. The conversion of the liquid in the cylinder into sulphurous anhydride gas is effected in the space of about five minutes. The duration of contact for the destruction of rats ought to be about two hours; for the destruction of insects a more prolonged contact is necessary.

R. St. J. B.

DE RAADT (O. L. E.). Trockene Hitze als Mittel zur Abtötung von Rattenflöhen. [Dry Heat as a Method of Rat-Flea Destruction.]

—*Arch. f. Schiffs- u. Trop.-Hyg.* 1918. Jan. Vol. 22. No. 1. pp. 1-3.

This investigation was undertaken in view of the encouraging results obtained by HALBERKANN with the use of dry heat as a means of destroying body-lice. Rat-fleas (*Xenopsylla cheopis*) were enclosed in glass tubes about 3 cc. in diameter with gauze stoppers and placed in the incubator under high and low conditions of relative humidity. The following results were obtained:—

No.	No. of <i>X. cheopis</i> .	Humidity of heated air.	Tempera- ture.	Duration of heating.	Result.
1	122	19	50° C.	15 minutes.	All fleas killed.
2	45	80	50°	10 "	"
3	72	25	48°	15 "	"
4	133	37	49·5°	10 "	"

When, however, the fleas are present in the fur of the rat a longer period of heating is necessary for their destruction. After 30 minutes at 50° C. some fleas remained alive in the fur of chloroformed rats, but after 45 minutes incubation at the same temperature, all fleas were killed. In order to simulate the conditions obtaining with fleas present in merchandise &c., when separated from their hosts, fleas were placed in tubes surrounded with linen or absorbent gauze. Under these conditions, all fleas were also destroyed at a temperature of 50° C. in 45 minutes.

It is suggested that dry heat might be used as an ancillary method in carbon monoxide disinfection, so that not only the rats but also their parasites might be destroyed with certainty.

R. St. J. B.

MALLANAH (S.). **Tobacco, Fleas and Plague.**—*Indian Med. Gaz.* 1918. Feb. Vol. 53. No. 2. pp. 53-56.

The use of tobacco as a pulicide is advocated on the following grounds :—

"(1) Tobacco kills fleas practically instantaneously.

"(2) Being a diffusible drug, its action is effective even at a distance of six inches.

"(3) Its action is permanent and continuous. Tobacco when spread on floors of houses will not only destroy fleas present at the time, but will go on destroying whatever fleas come later on to reinfest the house. Hence its action as a disinfectant goes on day and night as long as tobacco is kept spread out on floors.

"(4) Its substance is not used up in destroying fleas, hence it can be used over and over again.

"(5) It does not damp or mess the floors of houses.

"(6) As it is used in a dry state no caste or creed can reasonably object to its use.

"(7) It is a common and a cheap article.

"(8) Now, for the first time, it is being pointed out that plague-infected houses can be disinfected thoroughly by this method, though such disinfection is of no use for any other disease except kala-azar, which is a very fatal endemic disease said to be communicated by bugs. In case of the latter, however, infusion of tobacco would be preferable.

"(9) Reinfection of houses can be prevented as long as tobacco is kept in the house.

"(10) Above all this drug can be used as a preventive measure which will stamp out plague."

The most satisfactory method of tobaccoing houses is that of stitching the leaves on to a piece of cloth like a strip of matting, which is then laid on the floor. Powdered tobacco should be introduced into rat holes, which can then be firmly closed up with bricks and mortar.

Experiments carried out in the City of Hyderabad seem to have been very satisfactory. In one case mentioned a family living in one part of a house that was not tobaccoed contracted plague, while two families living in the same house, but in tobaccoed rooms remained free from infection. Out of 52 houses in highly infected areas which were tobaccoed, only one house became infected, while out of 52 "control" house seven became infected, showing that the tobacco failed (apparently) in 14·2 per cent. of cases and succeeded in preventing plague in 85·8 per cent. of cases experimented.

R. St. J. B.

DOELL (A.) & WARNER (Ch.). **Beiträge zum Nachweis der Pestbazillen in Rattenkadavern mittels der Thermopräzipitationsreaction.** [The Diagnosis of Plague Infection in Rats by means of the Thermo-precipitation Method.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1917. Aug. 11. Vol. 84. No. 1. pp. 67-80.

The conclusions arrived at by the authors with reference to the thermo-precipitation reaction of ASCOLI are substantially the same as those of BERLIN, who carried out a similar research in 1915 [this *Bulletin*, Vol. 7, p. 178]. The interaction between plague serum and extract of plague bacilli or plague infected organs is specific and can therefore be used for the diagnosis of plague infection in dead rats. The occurrence of an obvious positive reaction may be regarded as

a sure proof of infection, provided the following controls are carried out simultaneously. (a) Plague serum with extract medium (physiological salt solution) alone should not give any precipitate. (b) Plague serum with extract of plague bacilli or organ extract from a known case of plague should give a positive reaction. (c) Normal serum with such extract ought not to give any reaction. (d) The organ extract alone should not form any deposit after standing for 24 hours. Doubtful reactions give no definite information, while negative results may be due to a small concentration of plague bacilli in the infected organ.

On account of its simplicity and independance of climatic conditions (the test being applicable to putrid cadavers) the thermo-precipitation reaction may be regarded as a useful supplement to the usual methods of bacteriological diagnosis of plague. In employing the method one, however, has to consider the well known variation in the distribution of plague bacilli in the bodies of plague infected animals. The result of the reaction when bubo extract is employed should always be positive, in cases of plague infected rodents, and a negative result in such cases is absolutely against plague. The same applies, generally speaking, in acute cases where extracts from spleen or liver are used, but in chronic cases the bacilli at death in these organs are usually very sparse, and afford but a doubtful means of diagnosis with this test.

R. St. J. B.

UNCLASSED FEVERS OF THE TROPICS.

BYAM (W.), CARROLL (J. H.), CHURCHILL (J. H.), DIMOND (Lyn), LLOYD (Ll.), SORAPURE (V. E.) & WILSON (R. M.). i. **Trench Fever—a Louse-Borne Disease.** [With Discussion.]—*Trans. Soc. Trop. Med. & Hyg.* 1918. June. Vol. 11. No. 7. pp. 237–290. With 21 charts.

—, —, —, —, —, — & —. ii. **Trench Fever. A Report of Clinical Observations and Research as to the Etiology, Pathology, Prophylaxis and Treatment of Trench Fever among Troops.**—*Jl. Amer. Med. Assoc.* 1918. July 6, 13 & 20. Vol. 71. Nos. 1, 2 & 3. pp. 21–26; 110–113; 188–193.

i. An account of the research work on trench fever carried on principally at the Hampstead Hospital has been already published in other journals, but in the present paper the whole investigation is given in greater detail and many charts of the fever cases are introduced. The evidence obtained from the experimental work is summarised under 18 counts as follows:—

“(1) The whole blood from febrile trench fever cases, up to the 51st day of disease, when injected intravenously, is capable of reproducing the disease. *The incubation period in such infections varies greatly—from 5 to 20 days.*

“(2) The virus as contained in the circulating blood is destroyed by the addition of distilled water in large quantities.

“(3) The bites alone of infective lice do not produce trench fever.

“(4) The excreta of infective lice when applied to a broken surface of skin do readily produce trench fever. *The incubation period of such infections is remarkably constant and averages eight days.*

“(5) The excreta passed by lice fed on trench fever patients are not infective till the expiration of not less than five days from the commencement of the feeding on trench fever blood, thus indicating a development cycle in the louse or a period during which the organism multiplies.

“(6) Once lice are infective they remain so till at least the 23rd day from the date of their infection.

“(7) The virus of trench fever, as contained in infected louse excreta, is capable of withstanding drying at room temperature, exposure to sunlight, keeping for not less than 16 days, and heating to 56° C. for 20 minutes.

“(8) 80° C. for 10 minutes destroys the virus, which is therefore not a spore-bearing organism.

“(9) The bodies of infected lice when crushed upon the broken skin are capable of producing trench fever. When lice become so infective remains to be determined.

“(9a) Active trench fever blood equivalent to the content of 11 lice does not produce trench fever when rubbed into the broken skin.

“(10) Infection probably does not take place by the mouth or by inhalation.

“(11) The excreta of lice are not normally capable of producing trench fever.

“(12) Trench fever infected lice do not transmit the disease to their offspring.

“(13) There is a possibility of some attacks of trench fever being afebrile throughout.

“(14) The percentage of individuals naturally immune to trench fever is exceedingly small.

“(15) Old age is no bar to infection.

“(16) Such immunity as results from an attack of trench fever is not permanent, and may only persist for so long as the individual shows evidence of the disease.

"(17) Even as late as the 79th day of disease a patient's blood may remain infective, and be capable of infecting lice fed on such a patient while febrile.

"(18) The different varieties of trench fever result from differences in the persons infected rather than in the source of infection."

The great importance of the D.A.H. (disordered action of the heart) symptoms during or following attacks of trench fever is very strongly insisted on, as it plays such an important part with regard to further service of the individual, particularly as the condition may follow very slight attacks of the fever, and be associated with neurasthenia. Experimental researches were carried out to throw some light if possible upon the cause of the cardiac irregularity. The authors concluded that a specific action upon the vagus is associated with the fever. Observations in France were in accord with those of the authors that a transition from bradycardia to tachycardia in trench fever cases usually takes place after the 21st day of the disease, and in the greater number of cases between the 21st and 40th. They are in partial agreement with LEWIS that it is not due to hyperthyroidism; on the contrary they found cases were frequently benefited by use of thyroid extract.

The investigation was admirably planned and carried out in every detail, and the report is a very complete and instructive account of our present knowledge of the epidemiological and clinical features of the disease; the search for the causative organism is left over for a further report.

The paper was followed by a long discussion, in which Sir W. LEISHMAN, Sir David BRUCE, BASSETT-SMITH, SIMS WOODHEAD, RENSHAW, and BYAM took part. The question whether the bite of the lice may cause the infection quite apart from any rubbing in of excreta was chiefly debated.

ii. The importance of the disease consists mostly in its wide prevalence, heart complications, and great loss of service caused by it, though the mortality is low. As far as can be ascertained, the highest incidence of the disease is in the cold weather when delousing causes the greatest discomfort and when men tend to collect together to keep warm. A summary of the histories of 200 cases treated at the Hampstead hospital is given. Two forms, or stages, of fever are found, first an irregular remittent or intermittent fever lasting for about four weeks and divided into three types: (1) a fever lasting roughly three days, (2) a similar wave followed about the sixth day by a relapse, and sometimes followed by irregular fever, (3) a continuance more or less complete of the first wave into the relapse, often followed by prolonged or irregular fever; second, a definite intermittent fever often showing regular periodicity, extending over a period of many weeks; this is the late stage and the chart is very distinctive. A moderate leucocytosis precedes and accompanies the fever and albumen may be present in the urine. A short description of the geographical distribution of the three louse born diseases, Typhus, Relapsing Fever, and Trench Fever is given with some of their epidemiological characteristics.

With regard to prognosis it is stated that 90 per cent. of all cases in France yield quickly to treatment; the remaining 10 per cent. are those that find their way to England. Of 236 cases treated at Hampstead, giving an average disability of 4·5 months, only 6·2 per

cent. left the hospital free from symptoms. It is stated that the patient's weight is the best guide to prognosis. No drug or system of treatment could be considered to have any specific effect.

Prophylaxis depends upon an efficient method of delousing and the different methods are fairly fully discussed; thoroughness is the watchword. Scabies, by the irritation produced and the scratching caused, undoubtedly helps to promote inoculation of the trench fever virus if present, and it requires early treatment. Some specific treatment is urgently required, but for this the causative organism must be found.

P. W. B-S.

ARKWRIGHT (J. A.), BACOT (A.) & DUNCAN (F. Martin). **Preliminary Note on the Association of Rickettsia Bodies in Lice with Trench Fever.**—*Brit. Med. J.* 1918. Sept. 21. pp. 307-309.

The work was carried out in connection with the War Office Committee on Trench Fever, chiefly from clinical material at the Hampstead Hospital. The characters of the "Rickettsia Bodies" (small diplococci or bi-polar bacilli), as found in Rocky Mountain Fever, Typhus, and Febris Quintana or Trench Fever, which have been described by many observers in America, Germany, and elsewhere, are first given, and their frequent presence in the bodies of lice is noted, but it is pointed out that most of these observations were handicapped by the impossibility of obtaining "clean" lice for controls.

The paper itself is a summary of the work done and it is impossible to abbreviate it without missing points; it should therefore be read as it stands. The following points are however clearly put forward in the authors' conclusions.

"1. The constant presence after a suitable lapse of time, of rickettsia bodies in lice which have been fed on a trench fever patient has been confirmed.

"2. The absence of rickettsia bodies from lice bred in captivity and fed only on healthy men has been shown by our work, in contradistinction to observations made on the Continent where the population is much more exposed to infection and a clean stock of lice is more difficult to procure than in this country.

"3. A very close correlation has been shown to exist between the presence of rickettsia bodies in lice or the excreta of lice and the virulence of these materials when inoculated into men."

[Brumpt, working at Rennes, states that 73 per cent. of clothes lice removed from healthy men harboured *Rickettsia prowazeki*. Fifty of these lice which were subsequently proved to contain the bodies were allowed to feed upon him and no illness followed. Brumpt considers it to be a non-pathogenic organism, and that lice containing these bodies remain infected during the whole course of their existence (see this *Bulletin*, Vol. 12, p. 107).]

P. W. B-S.

DE NAPOLI (Ferdinando). **Le febbri estive o da pappataci sono le febbri delle trincee?—Loro identità con l'epidemia dominante attualmente in Europa.**—*Polichinico*. Sez. Prat. 1918. June 30. Vol. 25. No. 26. pp. 605-608.

The author, who has had considerable experience of epidemics of three day, summer, or phlebotomus fever in Italy, discusses its

relationship to trench fever, which he states is a generic name used to describe many different conditions at the front, not easily diagnosed. He gives the symptomatology of the present common widely spread form (of phlebotomus fever ?) and points out that trench fever (*febris quintana*) is much more limited in its distribution; he suggests that the vitality of the specific organism may be favoured by local war conditions. He points out that "*febris quintana*" is probably a spirochaetemia with the presence of spirochaetes in the urine, which however must not be mistaken for those found usually under the prepuce.

It is only by the discovery of the etiological origin of these various forms of fever that a diagnosis can be made, and should a spirochaetal origin be satisfactorily demonstrated, then both prophylaxis and treatment will be easily carried out by means of arsenical preparations.

P. W. B-S.

DELOGU (A.). *Sull' attuale febbre epidemica sviluppata fra gli equipaggi della Squadra.* [A Febrile Epidemic on Board Ship.]—*Ann. Med. Nav. e Colon.* 1918. May-June. Year 24. Vol. 1. No. 5-6. pp. 389-391.

In May, 1918 an epidemic of a short febrile disease broke out on board the Naval ships in port, and finally affected about one third of their complements. It was entered as influenza but there were peculiar characteristics. The fever was of short duration, two to three days, with marked headache, backache, eye-ball pain, and suffused conjunctivae; pulmonary symptoms were absent or only followed. The diagnosis from dengue and three-day fever was the chief difficulty, but the rapid diffusion pointed to an air-born germ.

P. W. B-S.

SACCONE (G.). *Sull' etiologia dell' attuale epidemia di febbri in Taranto.* *Nota preventiva.*—*Ann. Med. Nav. e Colon.* 1918. May-June. Year 24. Vol. 1. No. 5-6. pp. 391-396.

The author describes a similar epidemic in the fleet at Taranto during May, diagnosed variously as influenza, dengue, and phlebotomus fever. The season was too early for the latter and the flies were not abundant. One third of the fleet was affected and the disease spread very rapidly. The incubation was about three days. The symptoms were, rapid onset, severe pains, short high fever and pulmonary complications. Three forms are described, (1) abortive, (2) slight, (3) very severe and fatal; the latter were very rare, endocarditis generally bringing about the fatal termination. In the hospital 46 cases were complicated with pneumonia and 36 with pleurisy.

Blood cultures were made in 120, giving positive results in 28. The organism isolated was a Gram positive micrococcus, sometimes seen as diplococci or tetrads. On agar it grew as small white colonies, tending to turn yellow.

Intra-peritoneal inoculations into guinea pigs gave rise to a slight temporary rise of temperature only; animals examined on the fifth day did not show any sign of peritonitis, and the blood and

organs were sterile. Post mortem examination of a fatal case showed pneumonic consolidation, pleurisy and endocarditis, and an organism was isolated in pure culture from the pleuritic fluid; from a second the same organism was isolated from the pericardial fluid. The organism was also isolated from the pneumonic lung and from the sputum together with streptococci. In all the fatal cases the spleen and kidneys were large and congested. The prognosis was good if there were no cardiac complications. The author reserves a definite opinion as to the nature of the organism for a further examination.

P. W. B-S.

SAMPIETRO (Gaetano). *L'attuale epidemia di "febbre dei tre giorni."*
—*Ann. d'Igiene*. 1918. June 30. Vol. 28. No. 6. pp. 300-314.

The epidemic referred to is that which was widely spread in Spain, Italy, part of France, and Germany during the early part of the summer. It is a fever of short duration, with regard to the nature of which very discordant views are held, and it has been variously described as influenza, three-day or pappataci fever, trench fever, dengue, etc. The author reviews the symptoms of dengue, three-day fever, and trench fever, and then describes the characters found in the present epidemic very fully, with its epidemiology. He concludes that this is probably a recrudescence in an epidemic form of the three-day fever endemic in Italy, and referable to the disease described by DOERR in Dalmatia under the name of "pappataci fever." Clinically it is not dengue nor trench fever, nor does he think it to be influenza. The occurrence of the disease in the latter half of May to September is more in conformity with the history of three-day fever than of influenza and trench fever, and he points out that the distribution of the pappataci fly in Italy is very wide and they were increased during the epidemic period. It is very difficult to negative their being the agents of infection. The military sanitary authorities have recognised the great importance of a better knowledge of this pappataci fever and have issued information by means of circular letters drawing attention to the necessity of preventive measures being taken and giving very fully its etiology, methods of propagation, characters, and treatment. The author however considers that a further careful experimental examination should be made for its elucidation, drawing attention to seven particular methods of research.

[A analagous fever has been prevalent in England, where there are no pappataci flies; the evidence points to the disease being a bacterial one, very similar to, if not identical with influenza.]

P. W. B-S.

IDO (T.), ITO (K.) & WAJI (S.). [Seven-Day Fever, Report on the Pathogenicity and Certain Animal Experiments.]—*Chugai Iji Shimpo*. (Home and Foreign Medical News.) 1917. Aug. 5. No. 897. pp. 943-946.

[From Review by R. G. MILLS.]

This disease, which is called in the vernacular "Nakayami," prevails in certain districts of Japan in the fall and its symptoms resemble

somewhat those of haemorrhagic icterus. The cause is a spirochaete, not unlike that of haemorrhagic icterus but is distinct as proven by immunological reactions. Patients' serum taken just after recovery contains spirochaetocidal bodies. Wild rats harbour the spirochaetes in their kidneys and excrete them in their urine, and the distribution of these rats has a close connection with the distribution of the disease.

After injection into rats the symptoms produced are quite similar to those of hemorrhagic jaundice, but the guinea pig is much less susceptible to this form of infection; this is especially noticeable in the matter of lymph gland enlargement.

E. J. Wyler.

DENGUE AND PAPPATACI FEVER.

BONNE (C.). **A Dengue-Like Fever in Dutch Guiana.**—*Jl. Trop. Med. & Hyg.* 1918. Sept. 16. Vol. 21. No. 18. pp. 189-193. With 8 charts.

No cases of dengue have been previously described in Dutch Guiana. In 1917 the author observed in the Government Hospital of Paramaribo a mild fever, with short duration, of a dengue type. The onset was sudden with flushed face, conjunctival congestion, and headache, followed by pains in the limbs and joints, fever, and a well defined macular eruption. Three types of pyrexia were noticed: first, generally two or three days fever with a remission, and secondary rise terminating by a crisis; secondly, a ten or fourteen day fever ending by lysis; thirdly, a three day fever without a secondary rise; the last two forms were rare. A constant symptom was a definite leucopenia, the white cells once falling as low as 2,300 per cmm., associated with a relative increase of lymphocytes. There was a well marked racial immunity among the natives. The disease appears to be endemic, but was specially prevalent in 1917; recurrences were rare and newly arrived Europeans were nearly always affected. Both *Culex fatigans* and *Stegomyia calopus* were present in abundance. No experiments beyond the injection of patients' blood into guinea pigs were carried out, and these gave negative results. The absence of jaundice, haemorrhages, and albuminuria negatived yellow fever. Malarial parasites were not present in the blood, and the absence of catarrhal symptoms distinguished the disease from measles. The rapid recovery and mildness of the pains were unlike true dengue. In many ways the disease agreed more closely with the six-day fever of Panama and seven-day fever of India. The author considers it advisable to separate these dengue-like fevers from true dengue until the causative organism is found and differentiation made easier.

P. W. B-S.

JOLY (P.) & BARIL. **Courbature fébrile épidémique de trois jours, observée à bord du navire-hôpital "Bien-Hoa."**—*Bull. Acad. de Méd.* 1918. July 30. 3 Ser. Vol. 80. Year 82. No. 30. pp. 138-141.

Two days after leaving Salonika an epidemic fever of short duration broke out on board the hospital ship "Bien Hoa," affecting over 40 per cent. of those on board, and lasting ten days. The brunt of the disease fell on the patients who were most debilitated. The symptoms agreed most closely with those usually described as Mediterranean dengue. The importance of the disease, which is common in the Eastern Mediterranean, depends not on its severity to the individual, but on the loss of time and effective service it causes collectively. The etiology of the epidemic was not definitely made out, but the contagion was believed by the authors to have been carried by the air, possibly through dust infected by fleas.

P. W. B-S.

BUCKERIDGE (Guy L.). **Some Observations on an Epidemic of Sandfly Fever, occurring in One of H.M. Ships.**—*Jl. Roy. Nav. Med. Serv.* 1918. July. Vol. 4. No. 3. pp. 310-312.

This ship, on the East Indian Station, while undergoing a refit landed the crew; part were sent to a hill station and part were accommodated in the Sailors' Home. Cases of the fever occurred among the latter while on shore. On the 5th October the men all returned to the ship. The first case was noted on board on the 7th, and fresh cases occurred daily until Oct. 31. There was a total of 39, five officers, five marines, eleven seamen, fifteen engine room ratings, and three day-men. The ship left port on the 17th October. For the first few days none of the men from the rest camp were affected, but after that the distribution of cases was general and the infection was most common among those who slept between decks, where ventilation was difficult. *Phlebotomus* flies were found in the ship. The duration of the fever varied between six and seven days and convalescence was rapid. A secondary rise of temperature was noticed about the fourth or fifth days similar to that seen in dengue, but the absence of rash and slowness of pulse differentiated the two complaints. Aspirin was found most useful to relieve the headache and pains.

P. W. B-S.

JOUIN. **De la pression artérielle (Mx et Mn), de la puissance cardiaque (P) et du pouls dans le cours de la fièvre de 3 jours à Phlébotome.**—*C. R. Soc. Biol.* 1918. July 6. Vol. 81. No. 13. pp. 719-720.

From the examination of a considerable number of cases, mostly marine, the author obtained the following results. The maximum blood pressure was raised during the first 12 hours, then fell slightly; after 24 up to 72 hours it rose or remained stationary. The minimum is generally low in the first 12 hours, from the 24th to the 72nd hour it rises to the normal. This causes a hypersystole on the first day and slight increases in force of cardiac beat on the second. The curves of temperature and pulse are not synchronous. In all cases there is a marked bradycardia due undoubtedly to an increased irritability of the vagus caused by the virus of the disease, acting on the bulbar centres.

P. W. B-S.

LAMBERT (J.). **Sandfly Fever or Influenza.** [Correspondence.]—*Lancet.* 1918. Sept. 28. p. 434.

The author, who has had a considerable experience of sandfly fever in the Eastern Mediterranean, states that the resemblance between it and "Spanish Influenza" is only superficial. Both are generally marked by a sudden onset, a short period of pyrexia, and wide prevalence, but in the former the pharyngeal and pulmonary complications are very rare, the mortality is almost nil, and the local lesions of the bite of the sandflies on exposed parts of the body are generally evident. These, quite apart from any bacteriological investigations and prevalence of the flies in the district, are generally sufficient to distinguish the two diseases.

P. W. B-S.

SCOC CIA (V.). Febbre da pappataci o vera influenza ?—*Policlínico. Sez. Prat.* 1918. July 14. Vol. 25. No. 28. pp. 658–659.

The author points out that the widespread epidemic now present on the continent is not due to the phlebotomus or so-called three-day fever, but is a form of influenza. This opinion is strengthened by the fact that the diplococcus of Pfeiffer has been cultured from the sputum of these cases.

P. W. B-S.

PIRES DE LIMA (Américo). A epidemia reinante e a febre dos tres dias. [The Prevailing Epidemic and Three-Day Fever.]—*Med. Contemporanea*, 1918. July 14. Vol. 36. No. 28. pp. 217–218. With 1 fig.

The author, who suffered from the epidemic of three-day fever prevailing in Oporto, in June of the present year, announces that he had been able to capture several specimens of a Phlebotomus, in his apartments, which he believes to be *Papatasi*. Others were found in various districts of the city.

J. B. Nias.

MISCELLANEOUS.

JAMAICA. Six-Monthly Reports on the Work carried out in the Government Bacteriological Laboratory (i) April–September 1917. (ii) October 1917–March 1918. Kingston, Jamaica, B. W. I.—
[MS. Reports by H. Harold Scott, M.D., M.R.C.P. (Lond.), D.P.H., F.R.S. (Ed.). Government Bacteriologist.]

i. This Report, consisting of 134 typed foolscap pages and additional tabular matter, is divided into three sections: (1) Routine work; (2) Matters worthy of special note arising during the course of routine examinations; (3) Research work.

(1) Of 640 sera subjected to Widal's test 340 or 53·12 per cent. were positive; in the previous six months the positive percentage was 31·17 and these results are not vitiated by inoculation, which is hardly practised in Jamaica. The conclusion is drawn from these and other figures that enteric fever is far too rife in Kingston; and the disease has increased elsewhere in the Island. Figures are given for malaria, helminths [several tables] and amoebae. The percentage findings of the "Amoeba of dysentery" have increased (58·3 per cent.), which is doubtfully attributed to return of some of the contingent from the front.

(2) An epidemic of enteric on board ship (5 cases) was elucidated by the discovery that the assistant cook was a carrier and "was excreting typhoid bacilli." A case is related which shows "very clearly the connection between the so-called Vomiting Sickness and ackee poisoning." A child aged 3 was seen eating ackees; vomiting started and he died a few hours later; the autopsy showed the changes characteristic of vomiting sickness.

(3) The bulk of the Report [pp. 19–134] is occupied by a detailed account of Dr. Scott's investigations into the "Spanish Town Epidemic" which is believed to represent the acute stage of the "peripheral neuritis" of Jamaica. The summary given is as follows:—

"1. A certain epidemic broke out in the earlier months of this year among the labourers on a sugar estate in this island.

"2. The onset in each case was sudden, the patients being attacked while at work and apparently in good health.

"3. The initial symptoms in all cases were conjunctivitis and stomatitis.

"4. Thereafter the patients could be readily divided into two categories: (1) with intestinal symptoms; (2) with nervous symptoms.

"5. The diet of those affected consisted exclusively or almost exclusively of sugar cane.

"6. The cane tops which are cut or broken off are covered with small hairs which are very irritating and may have set up the original conjunctivitis and stomatitis, and, when swallowed, the subsequent diarrhoea.

"7. Fresh cases ceased with the cessation of the crop or almost immediately after.

"8. No case with early diarrhoea exhibited any affection of the nervous system.

"9. Nervous system cases were always constipated until the last two or three days before death.

10. Wassermann reactions with both the blood serum and the cerebro-spinal fluids were invariably negative.

" 11. Blood examinations revealed very little abnormality as regards total counts; differential leucocyte counts showed in all cases a marked relative lymphocytosis.

" 12. Arneth Index was very little different from what is found normally in natives in the tropics.

" 13. The morbid anatomy of the nervous cases is typical of a 'Central neuritis.'

" 14. There is no reason for thinking that the disease is pellagra in nature or has any relation with pellagra.

" 15. There is no reason for regarding it as beriberi.

" 16. There are many contraindications to the conditions being a new form of 'deficiency disease.'

" 17. There is every reason for considering these cases as representing the acute form or acute stage of what has for many years been erroneously spoken of as 'Peripheral Neuritis' in Jamaica.

" 18. There is no positive evidence that the disease is microbial in origin, at least not a bacteriaemia.

" 19. All the signs and symptoms tend to point to its being a condition of 'Intoxication.'"

This part of the Report will doubtless be published when it will be considered in more detail. [For a recent account of the peripheral neuritis of Jamaica see this *Bulletin*, Vol. 7, p. 375].

ii. In the second six months under review though Dr. Scott was without an Assistant Bacteriologist he succeeded not only in carrying on but in making 2,000 more routine examinations than in the preceding period (6,604 and 4,704) and also in accomplishing the valuable work which is described in the 97 typed pages of this Report.

In regard to the prevalence of enteric fever it is proposed to inoculate all children whose parents are willing. The examination of faeces for helminth ova showed a percentage of 89.54 (2,361 examinations); this is higher than in the previous period, which seems to be attributed to actual increase of infection and not to enhanced accuracy in examination. Out of 315 sputa examined there were 3 cases of bronchomycosis and one of *Streptothrix* infection.

The great bulk of the report [pp. 7-92] is occupied with the investigation of an epidemic of Vomiting Sickness. In September 1917 a large proportion of the natural food-stuffs was destroyed by a hurricane; Dr. Scott therefore expected a severe and wide spread outbreak of this affection. This in fact occurred but the mortality rate was much less than usual, only 30 per cent. instead of 90 per cent., which is attributed to the pamphlets and notices distributed over the island notifying the needed precautions. In this report 171 cases are described, with comments and accounts of the post mortem when such took place, and the salient facts of each case are given in a table. All but 13 were cases of ackee poisoning, and in two of these ackee took part.

"This in a nutshell [observes the author] is the final corroboration of my discoveries of 1915. . . It is high time that this reprehensible term of Vomiting Sickness be expunged from the nomenclature of diseases in this island, for the labelling of a disease by the name of one symptom, which symptom even may be absent, hinders advancement and leads to carelessness in diagnosis."

The author estimates that nearly 5,000 lives have been lost in Jamaica since the disease came into prominence in 1886. In this outbreak 47 per cent. of the cases were below 5 years of age, 71 per cent. below 10, and 83 per cent. below 15; sucklings are not attacked.

The average duration between the appearance of symptoms and death was 15½ hours; in two cases it was half and one hour. With regard to the proper procedure to prevent poisoning:—

“When the tree is shaken and the fruit in various stages falls, the ‘fit’ and opened pods should be picked up and those alone used for the next meal and only those with undeformed arilli; the mature and full ones should next be taken and placed to open away from the direct sun’s rays before they can be used with absolute safety, and any of these which do not so open in 2 or 3 days should be discarded; the immature unopened pods should all be picked up and taken away, as they will never be fit for eating; in order that they may not be found by children and inadvertently eaten, they ought to be burned. Boiling water appears to remove the poison completely or nearly so.” [In a copy of a “Notice” which is appended to the Report one reads “The ackees should not be shaken from a tree.”]

Poisoning is met by the prompt administration of alcohol which renders the poison inert, but it must be prompt. Much information is given in this interesting Report and it is to be hoped that it may be put into some more permanent form, to the confounding of the sceptical.

The rest deals shortly with the epidemic of Central Neuritis and is illustrated by a series of excellent microphotographs.

A. G. B.

LAGOS. Report of the Medical Research Institute for the Year 1916.

[A. CONNALL, Director.]—28 pp. Lagos: Published by the Government Press.

Helminthiasis.—It is noted that whereas *Ascaris* ova are extremely rarely found in the stools from a European resident, *Trichuris* ova are “not at all uncommonly encountered”; there are grounds for suspecting that some degree of anaemia is caused in Europeans by this parasite. The two are found with almost the same frequency in natives. The observations made on ankylostomiasis among the lunatics and institution staff in 1915 [see this *Bulletin*, Vol. 9, p. 374] were continued. Thymol treatment had been of little avail. Here the condition 18 months later is described with many details, and tables giving blood-counts for each person. Of 100 persons examined (51 native lunatics, 20 members of staff and 29 of their children) “38 male adults showed ankylostoma ova more or less abundant, but never difficult to find and in none of these was there clear evidence of Anaemia due to the action of Ankylostomum. Thirty-three adult females, all showing ankylostome ova in the faeces, yielded only two cases in which reasonable grounds were present for believing that an anaemia due to the action of Ankylostomes had occurred. Amongst 29 children there was only one, a boy of 15 years who definitely suffered from Ankylostomiasis anaemia.”

Three cases of vesical and one of rectal bilharziasis were met with.

Blackwater fever.—Information on the cases of blackwater which occurred in the two Provinces in 1915 and 1916 is here given in synopsis—39 cases, one that of a West African negro.

Leprosy.—Starting in May 1916 several cases in the Yaba Leper Asylum were treated by HEISER’s Chaulmoogra oil mixture injected into muscle [see this *Bulletin*, Vol. 5, p. 329]. An account is given of seven selected cases and several photographs. Improvement seems to have been general.

Spirochaetosis and Amoebiasis.—The faeces of 457 persons were examined with the results set out in the table; the sick suffered from diarrhoea or dysentery.

Table VII.

	Healthy.		Sick.	
	European.	Native.	European.	Native.
	29	170	102	156
<i>Spirochaeta eurygyrata</i> ..	1	27	3	35
<i>Cercomonas hominis</i> ..	0	15	1	6
<i>Trichomonas intestinalis</i> ..	0	7	0	9
<i>Tetramitus mesnili</i> ..	0	7	3	26
<i>Lambliia intestinalis</i> ..	0	4	1	2
<i>Balantidium coli</i> ..	0	4	0	3
<i>Entamoeba histolytica</i> ..	0	53	39	106

The spirochaetes are described, *in vivo* and stained; they were similar to *S. eurygyrata* with the exception of one from a European, whose case is described. With regard to the *E. histolytica* of the table, had *E. nana* then been named some would have been entered under that heading.

A case of yellow fever is described - from a cargo boat in Lagos harbour. Twelve sera agglutinated enterica bacilli—6 *paratyphosus* A, 4 *paratyphosus* B and 2 *typhosus*. Under Medical Entomology lists are given of the biting insects taken per month or sent to the laboratory.

A. G. B.

AUSTRALIA. The Australian Institute of Tropical Medicine. Half Yearly Reports from 1st January to 30th June 1917, and from 1st July to 31st December 1917. [A BREINL, Director.]—12 pp. 1918. Printed and Published for the Government of the Commonwealth of Australia by Albert J. Mullett. [Price 6d.]

This consists as usual of the Reports of the Director, the Biochemist (W. J. YOUNG), the Bacteriologist (H. PRIESTLEY, now resigned) and the Entomologist (F. H. TAYLOR). Seven children were admitted to the Queensland Hospital suffering from a "mysterious fever." Five died in coma. The lesions, as far as they had been examined, resembled those of acute anterior polyomyelitis. The spinal fluid of the 4th case was inoculated into the brain of a monkey, which succumbed to typical acute anterior polyomyelitis. Similar cases have occurred in New South Wales.

In the second half year the Director with the Entomologist visited Cairns to undertake a malaria survey. Cairns is a low-lying coastal town with a white population. It is intersected by mangrove swamps and has a rainfall of 90 inches. *Nyssorhynchus annulipes* is probably the carrier [nothing is said of dissections]. In all 657 samples of blood were collected, 45 of which showed simple tertian, and 43 subtertian parasites: i.e., 13·5 per cent. of persons examined (pallid persons or with recent fever) had parasites in their blood.

Samples of urine from 663 persons not showing any clinical symptoms of kidney trouble were examined for albumin, those only which responded to three tests being considered positive; there were 11·7 positives among males and 4·95 among females.

A list is given of the Culicidae and Tabanidae determined.

A. G. B.

INSTITUT PASTEUR D'ALGERIE. Rapport sur le Fonctionnement de l'Institut Pasteur d'Algérie en 1917. Par le Dr. Edmond SERGENT, Directeur.—20 pp. 1918. Alger: Imprimerie Administrative. E. Pfister.

The table of microbiological analyses shows that on the human side the most numerous were, in descending order, sero-diagnosis of enterica infections, of syphilis and of undulant fever, microscopic examination for tuberculosis, for malaria and for amoebic dysentery, cultures for bacillary dysentery. There were treated for rabies 1,714 persons with a mortality of 0·29 per cent. This is a greater number than in the preceding year [see this *Bulletin*, Vol. 10, p. 93] and the writer calls for the suppression of masterless dogs and cats, and the surveillance of domestic dogs and cats. An overwhelming (*foudroyant*) epidemic of malaria struck Oran in consequence of unusual meteorological conditions. Antimalaria measures have been hindered by mobilisation of the personnel, high price of quinine and petroleum, high wages, etc. They were carried out in the most feverous places. Of the 18 quinine distributors 8 were women. Large quantities of vaccines were turned out. A short account is given of the Mission of the Pasteur Institute to the Eastern Army (Macedonia) and the great decrease in malaria which resulted; the campaign against ophthalmia is briefly described [see below]. An account is given of the papers published, most of which have been noticed in these pages.

A. G. B.

BAHR (P. H.). Clinical and Pathological Co-Operation.—Jl. Roy. Army Med. Corps. 1918. May. Vol. 30. No. 5. pp. 525–532.

An address given before the Cairo and Delta District Medical Society in December, 1916, which should be read entire by all who are coming fresh to the problems of tropical medicine. The author deals first with the aid to be obtained from a simple blood examination in cases of pyrexia in Egypt, with reference to malaria and relapsing fever. These parasites failing, he advises the correlation of the temperature chart with a total and differential leucocyte count. The films for the latter should be stained with haematoxylin and eosin, for “any other stain gives, owing to specific reactions for glycogenic granules, etc. a totally erroneous idea of the due proportions of the different varieties of white cells present.” After discussing the various diseases to which a guide may thus be obtained he goes on:—

“An eosinophilia of over five per cent. without a leucocytosis in this country is almost diagnostic of some helminthic infection such as the ascaris or the ankylostome or the urinary bilharzia. But a high eosinophilia of twenty to thirty per cent. or over, together with a total leucocytosis of 10,000 to 15,000 white cells, in a patient with anaemia, emaciation,

enlarged liver, tenderness over the gall-bladder and often urticaria as well, should lead the pathologist to search long and on several occasions with a low-powered lens for the ova of the rectal bilharzia. There is no doubt that these cases—a chart of one of which has been exhibited this afternoon—suggest at first sight enterica. Rectal bilharzia (*B. mansoni*) then, which is occurring among the troops in Egypt, produces a systemic disease identical in its clinical features with “Katayama disease,” due to the allied *Schistosomum japonicum* in Japan. This is an entirely new clinical fact, and the credit of the discovery belongs to the staff of the Third Australian General Hospital. On the other hand the urinary bilharzia appears to produce no such marked systemic disturbance and only a slight eosinophilia.”

He refers next to the serum diagnosis of enterica and undulant fever and to GARROW’S agglutinator, from which “results of very great military importance have been obtained.” He has recently seen a series of cases of para-undulant fever in which the charts resembled closely those of military tuberculosis. He reminds us of a fact which, judging from published papers, is of by no means generally recognised, namely that the entamoeba and bacilli of dysentery are delicate organisms and die shortly (4 hours) after the stool has been passed and that a microscopic examination is then useless. He associates himself with WENYON’S dictum that any active amoeba with ingested red cells in a dysentery stool should be regarded as *E. histolytica*.

In the diagnosis of the dysenteries and for prognosis he lays great stress on the cell exudate.—

“Briefly then the presence of a number of macrophage cells—that is a large hyaline cell twenty to thirty microns in diameter, containing chromatic bodies and often red cells as well, but with no very definite structure—together with a large portion of pus cells, relatively few red cells, and few visible bacilli, indicates a bacillary infection and suggests a suitable stool for culture. These macrophage cells I have just mentioned are very important, as they have often been mistaken by the uninitiated in the past for amoebae, and being derived, as I have good reason to believe, from the submucosa, their continued presence in the stool is of favourable import as indicating that the repair of the tissues is taking place. On the other hand, bile-stained disintegrating pus cells and the intestinal epithelium, together with numerous bacilli in the microscopic field, denote that an extensive necrosis of the mucosa has taken place. Such a stool is quite unsuitable for culture and in many such cases I have been able to obtain a culture of the dysentery bacillus from the mucous membrane post mortem when I was quite unable to do so from the stool during life.”

He admits the existence of lamblia dysentery but thinks it is of relatively small importance and not a reason for permanent invaliding.

A. G. B.

PENNA (Oswino Alvares). **Notas sobre a comissão do Professor Lutz no Norte do Brazil.**—*Brazil Medico*. 1918. Apr. 20 & 27. Vol. 32. Nos. 16 & 17. pp. 121–125; 129–132.

Preliminary notes of a journey made with Professor LUTZ in the north of Brazil, for scientific purposes, of which a fuller account will appear in an early number of the *Memorias do Instituto Oswaldo Cruz*. It was on this journey that Professor LUTZ discovered the mode of infection of *Planorbis olivaceus* by *Schistosomum mansoni* [see this *Bulletin*, Vol. 9, p. 271, Vol. 11, p. 78]. Numerous cases simulating amoebic dysentery and alcoholic cirrhosis of the liver

were met with. A disease, locally termed bilious remittent fever, appeared to the members of the expedition to be nothing else than larval yellow fever, of which cases can easily penetrate up country after infection at the ports of landing, in the case of immigrants. From the results of summary examinations the percentage of the population found to be affected with ankylostomiasis is placed at 60 per cent., and for malaria the same figure is given. Six cases of bubonic plague were seen at Recife. A prevalent disease locally regarded as smallpox, but having but little fever and a mortality of only 1 in 200, was recognised as chickenpox, ordinary vaccination being no preventative. Syphilis was found to be widely prevalent. Chagas' disease was not met with, though *Triatoma* were common. The physical and social conditions of the population of the north of Brazil are extremely bad, and the author concludes his paper with some strong remarks on the supineness and indifference of the local authorities in all matters affecting the welfare of the common people.

J. B. Nias.

STUTZIN (J. J.). *Das Lazarett des Deutschen Roten Kreuzes in Bagdad.* [The German Red Cross Hospital in Bagdad.]—*Deut. Med. Woch.* 1918. Mar. 28, Apr. 4 & 11. Vol. 44. Nos. 13, 14 & 15. pp. 358-359; 382-383; 414-415.

The writer, who is described as the Director of the Red Cross Commission to Irak, gives an account of the conditions and hospital arrangements at Bagdad at the end of 1916 which contains some observations of interest. Remarking that the shade temperature was often 50° [122° F.] but that heat stroke was infrequent, he says that the natives keep the head and neck enveloped in heavy, usually dark, wraps, a custom which at first sight appears unwise. His explanation is that the coverings not only intercept the sun's rays but at the same time produce a constant layer of sweat which by its evaporation regulates the temperature. He saw the same headdress in the first Egyptian war. The windows were protected by a kind of shutter of desert thorn bushes on which was poured in the evening a large quantity of water which would evaporate in about a quarter of an hour. The heat was so great that clinical thermometers were placed in clay vessels filled with water; if left dry the glass burst. Rubber catheters kept best in talc in closed vessels. Wet dressings could not be used for wounds owing to the production of eczema and boils. The drinking water was brought from the Tigris in large clay vessels conical at the lower end which was plastered with clay; this served as a filter and to cool the water. An account is given of the disinfecting arrangements but without a figure it is difficult to follow.

A. G. B.

HOOTON (A.). *Tetanus and Technique.*—*Indian Med. Gaz.* 1918. May. Vol. 53. No. 5. pp. 174-176.

Two cases of tetanus, which occurred after operations at the Gokuldas Tejpal Hospital, Bombay, following on several cases of unsatisfactory healing of wounds, were attributed to "the use of a too small steriliser which had been packed progressively tighter (C512)

with every attempt to stiffen up the theatre technique." After the introduction of a larger steriliser these troubles ceased. In the years 1915-17 this hospital admitted 43 cases of tetanus, for which Bombay is notorious.

A. G. B.

SANDSTON (Alfred C.). Notes on a Case of Unilateral Chyluria and Two other Genito-Urinary Cases of Interest.—*New Zealand Med. Jl.* 1918. June. Vol. 17. No. 79. pp. 81-85.

The patient, a man of 35, had lived in the Pacific islands and "was supposed to have filariasis." His symptoms dated back two years. He had difficult and painful micturition with haematuria and passage of clots. When he was seen there was enlargement of the scrotum and its contents together with the cord, and a palpable tender right kidney. The urine was like milk, coagulating spontaneously. The blood was examined many times but neither here nor in the urine were filariae found. With the cystoscope the right ureter was seen "spurting much more vigorously than normal and about every 20 seconds a fire-hose-like jet of milky fluid." Many attempts were made to get a view of the opening of the left ureter, vision being obstructed by the opacity of the medium, but eventually the author satisfied himself that the left kidney was active. He therefore removed the right kidney, which seemed "relatively normal except for one haemorrhagic spot." The urine became clear but 3 days later the patient died. In a brief account of the post mortem, it is stated that the bladder and kidney were removed for further examination. This is the only case reported, as far as the author can learn, where the chyluria was limited to one side.

A. G. B.

MARTIN (C. J.). Concerning the Pathology and Etiology of the Infectious Jaundice common at the Dardanelles, 1915.—*Jl. Roy. Army Med. Corps.* 1918. Jan. Vol. 30. No. 1. pp. 102-109.

Col. Martin describes the epidemic of infectious jaundice which occurred during the autumn of 1915 at Gallipoli and to a less extent in Egypt. It was nearly non-fatal, usually without complete obstruction of the bile passages and there was no tendency to haemorrhages. The cases started with pyrexia, and slight enlargement of liver and spleen; the jaundice set in after 3-4 days; there was often slight albuminuria. Convalescence was slow. He sought the cause of the disease at Lemnos but without success and was unable to complete his enquiries because in 1916 the epidemic did not reappear. Reference is made to the papers of SAIRRAILLÉ and CLUNET [this *Bulletin*, Vol. 8, p. 73] who attributed the disease to a new variety of paratyphoid bacillus. His summary and conclusions are as follows:—

"(1) No parasites were discovered in blood films taken during the disease.

"(2) Blood cultures were sterile unless the jaundice supervened during an attack of typhoid or paratyphoid.

"(3) The observations made at No. 3 Australian General Hospital at Mudros do not support the conclusion of MM. Sarrailhé and ClUNET at Cape Helles that the jaundice was merely a manifestation of paratyphoid fever.

"(4) Bacteriological analysis of duodenal contents removed from patients affords no justification for the view that the jaundice was due to a bacterial infection spreading up the bile ducts.

"(5) The livers of two patients who succumbed during the convalescent stage of jaundice showed microscopical evidence of hepatitis with necrosis of liver cells.

"(6) It is pointed out that the infectious jaundice of Gallipoli, although much milder, presents analogies to the severer form *Spirochaetosis ictero-haemorrhagica*, and it is contended that the symptomatology and morbid histology are consistent with the view that it is primarily a systemic infection."

A. G. B.

SERGEANT (Edmond) & SERGEANT (Etienne). **Deuxième campagne antiophthalmique en milieu indigène algérien (1917).**—*Bull. Soc. Path. Exot.* 1918. Apr. Vol. 11. No. 4. pp. 304-305.

An account of the first campaign was given in this *Bulletin*, Vol. 10, p. 234. In 1917 it was waged in the same localities as in 1914. Two agents of the State quinine service visited the people in their homes with the object of recognising the first cases of ophthalmia and cutting the epidemic short by instilling drops of 1 per cent. silver nitrate. In one case the treatment was in progress from September 1 to October 30, in the other form from June 1 to November 23. The results were good, less so in the second case than the first because the epidemic had got a start: The number treated was 82.

A. G. B.

PARROT (L.). **Sur la rareté de la conjonctivite phlycténulaire chez les Indigènes algériens.**—*Bull. Soc. Path. Exot.* 1918. July. Vol. 11. No. 7. pp. 578-579.

In ten years' practice in Algeria the author has seen only two cases of phlyctenular conjunctivitis. Neither FOLEY, VIALATTE nor GROS, who have written on conjunctivitis in Algeria, mention this variety. Other eye diseases are extremely common. Pediculosis of the scalp and impetigo are very frequent among the native children, so that the hypothesis that *Pediculus capitis* is the cause of phlyctenular conjunctivitis (FONT-REAUXX) seems untenable.

A. G. B.

DE ALMEIDA (Waldemar). **A proposito de um caso confusão mental consequente ao impaludismo e á uncinariose.** [A Case of Mental Disease in a Patient suffering from Malaria and Uncinariasis.]—*Arch. Brasileiros de Med.* 1918. Apr. Vol. 8. No. 4. pp. 243-250. With 2 text-figs.

The patient was a white women, aged 33, in very poor circumstances, who was admitted to the asylum suffering from melancholia. Marked anaemia due to uncinariasis and chronic malaria was present. On suitable treatment all the symptoms improved, but the author does not prove very satisfactorily that the mental state was due exclusively to the bodily disorder. The mixture of oil of eucalyptus, chloroform and castor oil is recommended as the most satisfactory vermifuge for lunatics.

J. B. N.

MAGGIORE (S.). Osservazioni cliniche su alcune infezioni associate.
[Clinical Notes on Some Cases of Double Infections.]—*Pediatrics*.
1918. June. Vol. 26. No. 6. pp. 321-335.

Notes on some cases of double infection, mostly in children.

1. Child 8 years old. Malta fever and typhoid. *B. melitensis* isolated from blood. Five injections of *anti-melitensis* vaccine given without benefit. Typhoid bacilli found in stools, and the case treated with 5 anti-typhoid inoculations. Recovery after 29 days' illness.

2. Woman, aged 26 years. Symptoms of fever. *B. melitensis* isolated from blood; 4 doses of vaccine given without benefit. Widal test for typhoid done on 9th day of illness. Titre = 1:100 for *B. melitensis* and 1:200 for *typhosus*. Defervescence after 3 doses of typhoid vaccine.

3. Woman, aged 28. 10 days fever and diarrhoea. *B. melitensis* isolated from blood. Vaccine given without benefit. Intestinal haemorrhage. Widal test for typhoid = 1:200, and *B. typhosus* found in stools. Death on the 20th day of illness.

4. Woman, aged 26. For about a year past subject to irregular attacks of fever. For 8 days before admission to hospital high fever. *B. melitensis* isolated from blood, and agglutination = 1:100. Three doses of vaccine given without benefit. Sero-diagnosis repeated gave *melitensis* = 1:200, *typhosus* 1:100. Five anti-typhoid injections on alternate days produced rapid defervescence and recovery.

5. Boy, aged 6 years. 8 days fever, roseola on chest and abdomen, large spleen. Diazo-reaction positive. Marked anaemia, red-cells 1,800,000 per cmm. Sero-diagnosis, *B. typhosus* 1:200, other germs negative. Three doses of vaccine produced some general improvement, with change of fever to a remittent type. Blood examined for malaria, and numerous tertian parasites found. Treatment with quinine and recovery.

6. Girl, aged 8 years. Three days fever and diarrhoea, enlarged spleen. Sero-diagnosis, *typhosus* = 1:100. Marked anaemia. Two anti-typhoid injections given without much benefit. Sub-tertian parasites found in the blood. Immediate improvement on quinine.

7. Boy, 18 months old. Measles complicated with sanguinolent diarrhoea. *B. Shiga* isolated from stools. Death 3 days after admission.

8. Boy, aged 8 years, recovering from measles (15th day). Symptoms of dysentery. *B. Shiga* isolated from stools. Death on 28th day.

9. Girl, aged 3 years. 8th day of measles. Supervention of sanguinolent diarrhoea, &c. *B. Shiga* in stools. Downward progress and death after 40 days illness.

The cases are recorded to show the importance of adequate blood examinations in acute illness.

J. B. N.

NIJLAND (A. H.). Typhus, Cholera en Pokken in het Nederlandsch-Indische Leger en de prophylactische entingen tegen deze ziekten. [Enteric, Cholera and Smallpox in the Army of the Dutch East Indies, and Preventive Inoculation for the Same.]—*Geneesk. Tijdschr. v. Nederl-Indië*. 1918. Vol. 58. No. 2. pp. 286-309. With 5 charts.

A plea for the introduction of preventive vaccination into the Dutch East Indian Army, in which enteric fever at present causes from one-fourth to one-sixth of the total number of deaths. The tables are good and instructive.

J. B. N.

JANSEN (B. C. P.). "**Faecal-carcoma.**" [With English summary.]—*Geneesk. Tijdschr. v. Nederl. Indië*. 1918. Vol. 58. No. 1. pp. 168–172. With coloured plate.

Faecal carcinoma was the name given by DELGADO PALACIOS to "little chestnut-brown specks, like powdered tobacco in colour and appearance" lying "on and within the faeces of native dwellers" in the Atlantic tropical region. The organic matter of which almost 90 per cent. of this consisted was made up of urobilinogen, cholerythrogen and stroma. Lime to the extent of 6·2 per cent. was another constituent [see this *Bulletin*, Vol. 10, p. 46]. The author examined similar specks in the faeces of natives in the Dutch East Indies and figures them under magnification. He gives the following summary of his investigation:—

"In tropical countries it frequently happens that we find the stool clotted [¶ dotted] with little black spots. On washing away the substances of a smaller specific weight, we retain a dark-brown powder. On examination, this powder proved to be derived from bananas.

"By extraction with alcoholic hydrochloric acid, a bright red solution was obtained, which showed an absorption band in the green. The same substance could be obtained from bananas. After eating bananas these corpuscles remain some two weeks in the stool."

A. G. B.

GAIDE & RONGIER. **Note sur la fréquence des calculs de la vessie et de l'urèthre chez les Annamites.**—*Bull. Soc. Méd.-Chirurg. Indochine*. 1915. Oct. Vol. 6. No. 8. pp. 298–301.

In seven months the authors have seen 24 cases of stone in the bladder and urethra of Annamites, of whom 9 were children under ten. The average weight was 3 grammes and they were always single. Three which were analysed were composed chiefly of phosphates. In view of the many child patients the calculi are believed to be primary. Stone in the kidney was not met with and is extremely rare. The authors discuss the origin of the urethral and bladder calculi without coming to any decision and give an account of their treatment.

A. G. B.

JOUIN. **Remarques sur la moindre résistance du gonocoque chez les Noirs. Résultats comparatifs du même traitement chez les Noirs et chez les Blancs.**—*Bull. Soc. Path. Exot.* 1918. June. Vol. 11. No. 6. pp. 438–439.

The author has obtained "very encouraging results" from the treatment of acute and chronic gonorrhoea by "ozonised and ionised isotonic solutions." He finds that Malagasies are more readily cured than European sailors and soldiers; the first recovering in from 5 to 12 days and the latter in from 9 to 18 days. The yellow races (Chinese and Japanese) take an intermediate place. Bacteriological examinations were concurrent with treatment. The cases had not relapsed after two months.

A. G. B.

MOUGEOT (A.). *Fragilité du cœur droit chez les soldats de la race nègre occidentale d'Agrique. Diagnostic phlébographique et radiologique.*—*Arch. des Mal. du Cœur.* 1918. Jan. Vol. 11. No. 1. pp. 12–37. With 9 figs.

Of six Senegalese soldiers admitted to hospital in France, in four days in 1917, for simple bronchitis or subacute pleurisy five showed, indisputably, old organic or acute functional disorders of the right heart. The clinical diagnosis was confirmed by orthodiagraphic tracings. The five cases are given in some detail; one, of acute functional tricuspid insufficiency and fulminating asystole of the right heart in the course of double sub-acute pleurisy, came to autopsy. The author discusses the cases at length under the headings, aetiology; symptomatology; stethoscopic, phlebographic and radiologic diagnosis; therapeutics; and prognosis. The failure of the right heart in simple bronchitis is attributed to peribronchial hyperaemia, not inflammatory, forming a mechanical hindrance to the lesser circulation. He concludes (1) that in the natives of West and Central Africa there is excessive frailness of the right heart, less so in Somalis, and non-existent in Arabs (ten Arabs with acute pulmonary affection showed no signs of it). (2) This is shown by a relatively great frequency of tricuspid stenosis (probably acquired) and by an excessive frequency of functional tricuspid incompetency in the course of mild catarrhal bronchitis and, a fortiori, pneumonia and bronchopneumonia. (3) The tricuspid incompetency develops rapidly into grave asystole, which can be averted only by digitalis. Revulsive treatment must be energetic. (4) Tricuspid stenosis seems to be a safeguard against tricuspid incompetency in acute broncho-pulmonary affections. (5) In blacks, the murmur symptomatic of tricuspid incompetency is always more intense than it is in whites.

A. G. B.

WRIGHT (Hasell). *A Case of Syphilitic Fever.*—*Indian Med. Gaz.* 1918. June. Vol. 53. No. 6. pp. 213–214.

The patient had had frequent attacks of fever for the past 3–6 months, treated as malaria. There was an ulcer in the right femoral region, a sinus in the perineum and “several dark ecchymotic-looking patches over both tibiae.” Treatment by liq. hydrarg. perchlor. and pot. iod. and by inunction of mercury was unsuccessful, irregular fever continuing. Grey powder, 1/3 grain twice a day, with 5 grains of Dover’s powder was at once effective. No history of syphilis was obtainable.

A. G. B.

BLUMENTHAL (A.). *Kasuistische Beiträge zu den nervösen Störungen bei Pappatacifeber und Malaria.* [Illustrations of Nervous Disorders in Pappataci Fever and Malaria.]—*Berlin. Klin. Woch.* 1918. June 17. Vol. 55. No. 24. pp. 570–571.

The observations were made in a nose, throat and ear department; 5 cases of pappataci fever and 3 of malaria are given. In two of the former deafness came on within a few days of the fever; the condition is ascribed to toxic neuritis of the auditory fibres of the auditory

nerve. In another patient there was neuritis of the auditory and glossopharyngeal nerves with temporary loss of smell and neurasthenic symptoms. Another patient lost sense of smell for a week and said that his comrades who had pappataci fever had suffered likewise. In the malaria cases the symptoms took the form of paralysis of the rectus externus, loss of speech, and paralysis of the adductors of a vocal cord. In pappataci fever the author gives pyramidon rather than aspirin, which may act detrimentally on the auditory nerve.

A. G. B.

SHIMURA (S.) & OKABE (Y.). [**Blastomyces in the Digestive Tract of Man. First Contribution.**].—*Tokyo Igakukai Zasshi (Mittel. d. Gesellsch. z. Tokio)*. 1917. Apr. 5. Vol. 31. No. 7. pp. 45–61.

[From Review by R. G. MILLS.]

The Japanese diet being largely carbohydrate in nature has probably been responsible for the frequency of yeasts in the intestinal tract of these Orientals. The stomach contents of 19 healthy Japanese were examined and the faeces of 39 individuals, and means were used to isolate any yeasts that might be present. The gastric contents of 17 people yielded 21 strains and the faeces of 30 28 strains. Of the 21 strains 13 were *Torulas*, 6 belonged to the group of *Saccharomyces* and 2 to the *Mycoderma*. Of the 38 fecal cultures 18 belonged to the *Torulas*, 13 to *Saccharomyces*, 1 to “*Torulaspora*,” 3 to “*Pichia*” and 3 to *Mycoderma*.

A. G. B.

KANA (K.), YOSHIDA (K.), SATO (K.) & MIDORIGAWA (K.). [**Diarrhoea and Bloody Vomiting.**] [3 articles condensed into one.].—*Jikwa Zasshi (Jl. of Pediatrics)*. 1917. June 20. pp. 1–44.

[From Review by R. G. MILLS.]

i. The disease is called, for want of a better name, “*Hemorrhagica gastro-intestinalis dyspepticum*” and is different from any thus far described. It is in epidemic form and apparently contagious, though no dysentery, typhoid or paratyphoid bacilli could be found. The essential lesion is a bleeding from the stomach and small intestines.

ii. The result of faeces examination was merely such as found in hemorrhage high up, the colour was tar-like and yet here and there intact red cells could be distinguished. There was an absence of mucus and no distinctive odour. Various cultural methods were employed but without isolating any one form common to all and that had any agglutinative action with blister fluid taken from the patient. Experiments with the guinea pig were without result.

iii. At autopsy the lesions were petechiae of the ileum and fatty change of the liver and kidneys. These suggested some toxin which was perhaps absorbed through the intestine, had a selective action on the ileum and produced a toxemia manifesting itself in the fatty metamorphosis.

A. G. B.

VAN HOOF (L.). Essais de traitement au moyen de l'émétine d'affections autres que la dysenterie amibienne.—*Bull. Soc. Path. Exot.* 1918. May. Vol. 11. No. 5. pp. 401-405.

The author, who writes from Leopoldville, has employed emetine in affections accompanied by congestion of the pelvic organs, e.g., haemorrhoids, acute prostatitis, dysmenorrhoea, bilharzial dysentery, as well as in gastric ulcer with haematemesis and ankylostomiasis with passage of blood, with more or less success. Where there was blood in the stools it disappeared. The drug has a happy influence, he states, on haemoptysis, haematemesis and capillary haemorrhages of the intestinal mucosa. [Cf. this *Bulletin*, Vol. 11, p. 228.] Given in intravenous injections it sometimes proved a powerful taenifuge; 8 successful cases are mentioned.

A. G. B.

RAILLIET (G.). Erythème consécutif aux injections de chlorhydrate d'émétine.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Dec. 31. 3 Ser. Vol. 33. No. 35-36-37. pp. 1266-1268.

In the case of a soldier under emetine treatment for amoebic dysentery the injections were at first well borne but later, complaint was made of pain at the site of two previous injections. Round each puncture was an erythematous medallion, paler at the centre, the derma infiltrated, with pain acute on pressure. The lesions measured $2\frac{1}{2}$ to 3 cm. in diameter. Certain hypotheses being negatived by investigation, it was suggested that traces of the solution had been left in the derma during the passage of the needle. Instructions were given to the assistant not to employ the needle which he had used to aspirate the contents of the ampoule and no further trouble occurred. The author however is not wholly satisfied with this explanation.

A. G. B.

GUGLIELMETTI (J.). La toxicité du chlorhydrate d'émétine.—*Presse Méd.* 1918. Jan. 24. Vol. 26. No. 5. pp. 43-45.

Here are collected the published cases of emetine poisoning in man, with three fresh cases from Buenos Ayres. A man who received a total of 1.08 gm. in 33 days complained of general feebleness with paresis of the limbs, neck muscles and muscles of mastication, lasting nearly a month. A patient previously treated, with an interval of two months, suffered after a 5th injection of 0.1 gm. with heaviness of the head, vertigo and asthenia.

A dog which received daily a dose equal to a tenth part of that which was lethal in 24 hours, died in 69 days.

A. G. B.

DE LA PAZ (D.) & MONTENEGRO (R.). Does the Irritant Action of Emetine Hydrochloride extend to the Kidney?—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1918. Jan. Vol. 13. No. 1. pp. 49-52.

To answer this question emetine hydrochloride (Paul-Merch) was injected under the skin of dogs, 1 mgm. per kilo of body weight, daily till death. It was found to give rise to "congestion and slight

parenchymatous degeneration of the kidneys." The irritant action did not extend to the parenchyma. If the drug is eliminated by the kidneys, it passes through them in very high dilution. [For the elimination of emetine by the urine in man, see this *Bulletin*, Vol. 11, p. 228.]

A. G. B.

LEGER (André) & CERTAIN (B.). **Un cas d'intoxication par l'émétine.**—*Bull. Soc. Path. Exot.* 1918. May. Vol. 11. No. 5. pp. 405-406.

The patient was a man of 34, resident in French West Africa, with chronic malaria and amoebiasis dating back to 1911. Between December 19 and 24, 1917, he received daily a subcutaneous injection of 0.04 gm. of hydrochloride of emetine, and again between February 2 and 7 and between March 8 and 13—a total of 0.72 gm. On March 15 he had a sudden call to stool and vomited. The vomiting lasted a day. Giddiness came on and persisted for 5 days whenever he sat up in bed. In 6-7 days symptoms disappeared. The author calls attention to the small and discontinuous dosage, and to the absence of asthenia and sensory symptoms; the reflexes were normal. He refers to the work of MATTEI and RIBON on elimination by the kidney [see this *Bulletin*, Vol. 11, p. 228] and suggests that the renal function of this patient was impaired by malaria and dysentery.

A. G. B.

CAWSTON (F. G.). **Deafness and the Tropics.**—*S. African Med. Rec.* 1918. June 22. Vol. 16. No. 12. pp. 185-186.

Persons with Eustachian incompetence are advised not to reside at a low altitude nor to travel in the tropics. A tendency to nasal catarrh from deflected spur or septum with associated deafness is another bar. Malaria and dysentery are both liable to aggravate deafness, probably through the associated anaemia. The author notes as surprising that deafness following malaria is attributed to the quinine taken rather than to the disease. Permanent deafness due to quinine is nerve deafness whereas most cases of deafness returning from the tropics have middle ear catarrh. Deafness in men returning [? to South Africa] from active service in the tropics is usually due to malarial toxæmia or dysenteric anaemia.

A. G. B.

DOYNE (P. G.). **Myopia and Myopic Astigmatism in Relation to the Glare of Mesopotamia.**—*Brit. Med. J.* 1918. May 18. p. 563.

The glare experienced in Mesopotamia for nine months of the year is described by the writer as a very real trouble. The troops are supplied with glare protectors fitted with green-tinted glass. Persons with myopia and especially myopic astigmatism suffer very much, so much so as often to render them useless for any outdoor

employment, even with glare protectors over their correcting glasses or with tinted lenses. A case of unusual severity is reported, a man who was wearing —7 D. spher. before both eyes and lost his vision twice on coming into the sunlight. His sight returned and he was evacuated to India.

A. G. B.

MALDONADO (Angel). *Las Termas de Socosani en Yura, Arequipa, Peru.* [The Hot Springs of Socosani.]—47 pp. With 6 plates. 1918. Lima: Oficina Tipografia "La Opinion Nacional."

These springs are situated at a height of 2,345 metres above sea-level, not far from Arequipa. There are five springs, having an average temperature at the source of 30° Cent. The solids per litre range from 1.2 to 2.0 grammes for the different springs, the principal constituents being carbonate of soda (0.6 gm.) sodium chloride (0.36 gm.) ferrous carbonate (0.074 gm.) and silica (0.08 gm.) with calcium and magnesium carbonates in lesser quantity. The gases contained are sulphuretted hydrogen, nitrogen and carbonic acid (2 gm. per litre). The waters are bottled for export.

J. B. N.

CASTELLANI (A.), SPAGNUOLO (V.) & RUSSO (C.). *Quelques observations sur le Spirobacillus zeylanicus* Cast.—*Bull. Soc. Path. Exot.* 1918. Apr. Vol. 11. No. 4. pp. 271–274. With 2 figs.

Spirobacillus zeylanicus, described in 1909 and 1910, is said to be a very polymorphic germ, the classification of which is difficult. Owing to the presence of rather thick filaments and sporiform bodies it may belong to one of the higher organisms such as a Hyphomycete. On coloured media (Drigalski-Conradi, Endo) and on agar its colonies resemble those of true dysentery and typhoid. It does not produce gas with any sugar. On superficial examination of dysenteric stools it might be a cause of confusion. Two figures are given.

A. G. B.

CONNAL (A.) & RALSTON (W.). *Some Experiments with the Fruit of Blighia sapida* in Nigeria.—*Jl. Trop. Med. & Hyg.* 1918. Apr. 15. Vol. 21. No. 8. pp. 81–84.

Blighia sapida, the ackee of Jamaica, proved by H. H. SCOTT to be the cause of the "vomiting sickness" of that island [see this *Bulletin*, Vol. 7, p. 381 and above], is indigenous to West Africa. The Yoruba name is "isin." There is no trade in the fruit around Lagos. Those who eat it collect it themselves and only the aril is eaten. Seven series of experiments were carried out on native puppies, the placentas, arils and husks of unripe, ripe, and overripe fruit being made into a decoction, either singly or in combination, and fed to the dogs. The following are extracts from the authors' summary:—

"Mixed extracts, i.e., prepared from placentae and arilli boiled together caused the death of the puppies in the following instances:—

"(a) Extract No. 11, consisting of placentae from green-seeded unripe fruits and arilli from blackseeded unripe fruits, in two doses, each equalling

the soluble watery extracts of the parts from five fruits, caused the death of Dog II within twenty-four hours. The result was confirmed with Dogs VI and VII. The liver and the kidney showed the characteristic changes due to "vomiting sickness," as described by Scott.

"(b) Extract No. 15, consisting of placentae from over-ripe fruits and arilli from green-seeded unripe fruits, in two doses, each equalling the soluble extracts of the parts from five fruits, caused the death of Dog III within forty-one hours. The result was confirmed with Dog VIII, the death occurring within sixteen hours.

"(e) Using decayed placentae obtained from fruits which had ripened on a broken bough, and had proceeded to decay, a fatal result was obtained in Dog I by the use of extract No. 22 prepared from decayed placentae and decayed arilli. A single dose, representing the soluble watery extracts of the parts from five fruits, caused death within twenty-four hours. This result was not confirmed in the case of Dog IX, which received similar treatment.

"(f) Collapse was sudden, and no signs of illness were detected until within half an hour of death in any of the animals except Dog VIII, which was obviously ill for about eight hours before death.

"Vomiting was not observed in any of the cases. Convulsions only set in during the last few minutes of life."

A. G. B.

TEMPELAAR (H. C. G.). *Over het reukvermogen bij Inlanders.* [The Power of Smell in Natives.]—*Meded. Geneesk. Lab. te Weltevreden.* Feestbundel uitgegeven ter gelegenheid van de opening van het nieuwe geneeskundig laboratorium te Salemba, Weltevreden. 1917. Batavia: Javasche Boekhandel & Drukkerij. (pp. 226-229.)

It is commonly thought that the acuteness of the various senses in coloured races is greater than in white men. The traveller von HUMBOLDT declared that he had met with native races in whom the power of smell was so keen that they could trace game like dogs. To test this idea, the author of the present paper made some comparative trials on Javanese and Europeans with a modified form of Zwaardemaker's olfactometer, but the result was to show no particular difference in keenness of smell. The results are tabulated as follows:—

Substance used.	Average of 4 Javanese.	One European.
Ethyl acetate ..	7.6	7.0
Nitrobenzol	0.8	0.6
Coumarin	1.4	1.3
Terpineol	2.0	2.0
Ethylamine	1.1	1.0
Guaiacol	0.5	0.6
Valerianic acid ..	0.55	0.4
Pyridine	0.55	0.4
Skatol	4.0	4.0

The construction and use of Zwaardemaker's olfactometer is described in TIGERSTEDT's "Physiological Methods," Vol. 3.

J. B. N.

MAGALHÃES (Octavio). *Ensaios de Mycologia.* [Mycological Methods.]—*Brazil Medico.* 1918. June 15. Vol. 32. No. 24. pp. 185-186.

For growing *Oidium braziliense* from sputum the author recommends the following method. The fresh sputum is spread out and dried

upon a microscopic slide, of which the end is then stood vertically in a tube of Sabouraud's glucose broth, so that the film of sputum is partially immersed. In the course of 48 hours, points of growth are seen in the film from which the fungus can be isolated in a state of purity, and inoculated again on to solid media. In this way contamination from the bacteria present in the sputum is said to be avoided.

J. B. N.

DE LANGEN (C. D.). Stikstofretentie en de constante van Ambard bij de bewoners der Tropen. [Nitrogen-Retention and Ambard's Constant in Inhabitants of the Tropics.]—*Geneesk. Tijdschr. v. Nederl-Indië*. 1917. Vol. 57. No. 6. pp. 813-832.

Ambard's constant is the ratio between the percentage of urea present in the blood-serum and the total amount excreted by the kidneys in the 24 hours. For healthy persons the constant should be approximately .070, and the amount of urea in the blood-serum 200 to 500 milligrammes per litre. The author finds that, in healthy persons in the tropics, the constant is approximately the same. With patients in hospital under treatment for malaria with quinine, the constant is extremely low (.020 to .050). VON NOORDEN and others have observed that the free administration of quinine has this effect of lowering the intake and output of nitrogen. In cholera patients the constant is a valuable index of the chance of recovery. Patients with less than 2.5 grammes of urea per litre of serum usually recover, while those with higher amounts generally succumb (see the author's Table VII). With renal disease the constant is a valuable aid to prognosis. In granular kidney figures of .09 to 0.10 are met with, while in parenchymatous nephritis and orthostatic albuminuria, the figures are normal.

J. B. N.

DE LAROQUETTE (Miramond). Expériences sur l'action bactéricide de la lumière solaire (lumière blanche totale et lumières partielles ou de couleurs).—*Ann. Inst. Pasteur*. 1918. Apr Vol. 32. No. 4. pp. 170-192. With 3 figs.

The questions which the author set himself to answer in this investigation were:—To what degree is the sun's light bactericidal in the air, in liquid and solid media? To what depth does it act? What intensity and what duration are necessary? Is the action chemical, calorific, or desiccative? How in this respect do the various rays differ? The experiments were made at Algiers in summer and in winter, glass houses with white or coloured glass being constructed for the purpose. The organisms used were *B. coli*, *B. typhosus*, a *Streptococcus*, a *Staphylococcus*, *V. cholerae*, *M. melitensis* and yeasts. Solar light was found to be bactericidal only in the case of prolonged or powerful direct insolation, especially on the surface of dry media and in the air. White light was much more active than partial light. Next in order came blue, yellow, red and lastly green. The most active part of the spectrum is the luminous part. The death of

bacteria in the sun is due to an excessive absorption of energy, of which the first effect is usually dehydration and coagulation of the protoplasm. Practically, the author says, in hygiene and therapeutics it would be futile to reckon much on the direct bactericidal action of solar light, which can act only at a few millimetres depth. In heliotherapy, however, it has been demonstrated that bacteria enclosed in the tissues are affected; this in an indirect effect depending on the biotic action, local and general, of the solar light on living tissues and its importance cannot be exaggerated. The circulation and functioning of the organs are stimulated and their means of defence augmented.

A. G. B.

ACOSTA (José del C.). *Leucoelitos y equilibrio leucoelitario en Bogotá*. [Leucocytes and Leucocytal Formulæ in Bogotá.]—*Repert. de Med. y Cirug.* 1918. Apr. Vol. 9. No. 7. (No. 103.) pp. 340-374.

From the examination of the blood of 100 healthy persons, mostly adults, residing in Bogotá [Republic of Colombia], the author comes to the following conclusions.

The normal leucocytal count for that locality may be given as follows:—

	Mean.	Max.	Min.
Polynuclears (neutrophile)	55	70	40
Lymphocytes (small and medium) ..	35	50	20
„ (large)	2	3	1
Eosinophiles	3	5	0
Basophiles	1	2	0
Transition forms	2	3	1

The normal number of white cells per cmm. may be stated as follows; mean, 8,500, max., 12,500, min., 5,000. Eight children, ranging from 3 to 13 years, included in the number of 100, did not give figures varying sensibly from those of the 92 adults, the numbers ranging from 5,400 minimum to 13,400 maximum. In Bogotá therefore no leucocytosis can be considered, with certainty, to be pathological that is under 15,000 per cmm.

Particulars are added of a case of hepatic abscess which was operated on and which eventually got well, showing typical fluctuations in the leucocyte count at various periods of the illness.

J. B. N.

ISHIHARA (F.). i. [A Study of Globe-Fish Poison.]—*Tokyo Igakukai Zasshi* (*Mittel. d. Med. Gesellsch. z. Tokio*). 1917. Mar. 5. Vol. 31. No. 5. p. 50.

— ii. [Physiological Action of Tetrodonin, the Toxin from the of the Globe-Fish.]—*Ibid.* June 20. No. 12. pp. 12-55.

[From Reviews by R. G. MILLS.]

i. The application of this poison to a preparation of the intestine of a cat or rabbit causes an acceleration of peristaltic movements. This is not due to stimulating the terminals of the vagus but to paralysis

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[See also under **Disease Headings.**]

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